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Acme Steel Expands Cold Strip Capacity

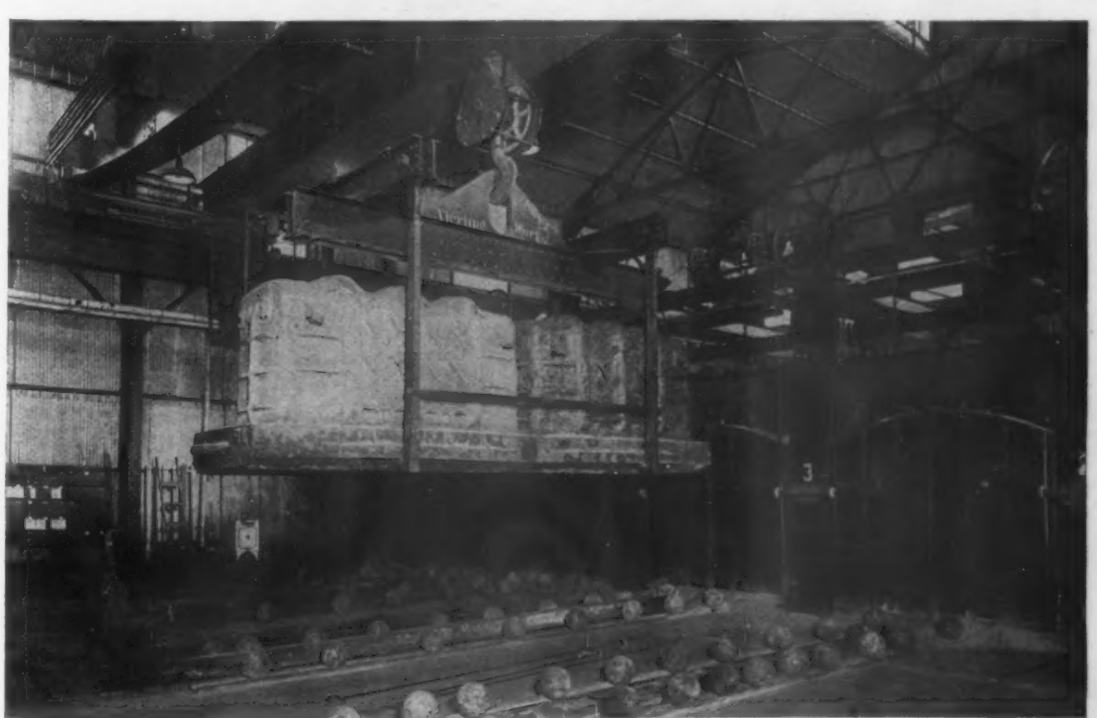
New Mill Has Latest Equipment—Features Include Recoiler, Cooling Gas for Annealing, Automatic Roll Grinder—Material Handling Facilities Comprehensive

BY GILBERT L. LACHER

RECENT completion of a cold rolled strip mill at the Riverdale, Ill., plant of the Acme Steel Goods Co. marks the latest move of that organization to meet the increasingly diversified demand for steel products, particularly in the lighter forms of finished steel. Starting in a small way in 1880 as a manufacturer of barbed box straps and other shipping department supplies, the company has steadily expanded the scope of its business until today it occupies a leading position as a maker of hot and cold rolled strip steel, steel box and bale bands, black and galvanized tight barrel and tub hoops, beaded hoops for slack barrels and nailless strapping used in reinforcing packages for shipment.

Until 1918 the company's production facilities were confined to its plant at 2834 Archer Avenue, Chicago, and output was limited to cold rolled strip steel and miscellaneous manufactured products, the most important of which have been mentioned. By that time, however, its business had grown to such proportions that the need for a more dependable and reliable source of raw materials led to the purchase of a large acreage at Riverdale, a Chicago suburb, and the erection there of a hot rolled strip mill with a capacity of 70,000 to 80,000 tons a year.

The construction of this plant, moreover, insured important economies in raw material costs. Completed on June 1, 1919, it is a 10-in. mill, comprising 13 two-high stands, and reduces 1½ to 2-in. square billets 30 ft. long to strips 1 to 2½ in. wide and ranging from No. 11 to No. 23 gage. The rolling speed of the mill is 2000 to 2500 ft. per min., so that one end of a billet is still in the heating furnace while the other end is



The Five-Chamber Smallwood Annealing Furnace Is Coal-Fired. The charging machine and the grappling device embody late designs of the United Engineering & Foundry Co.

being wound in finished coils. The coils, which measure 1000 to 2000 ft., are notable for the continuous length in which the material is available.

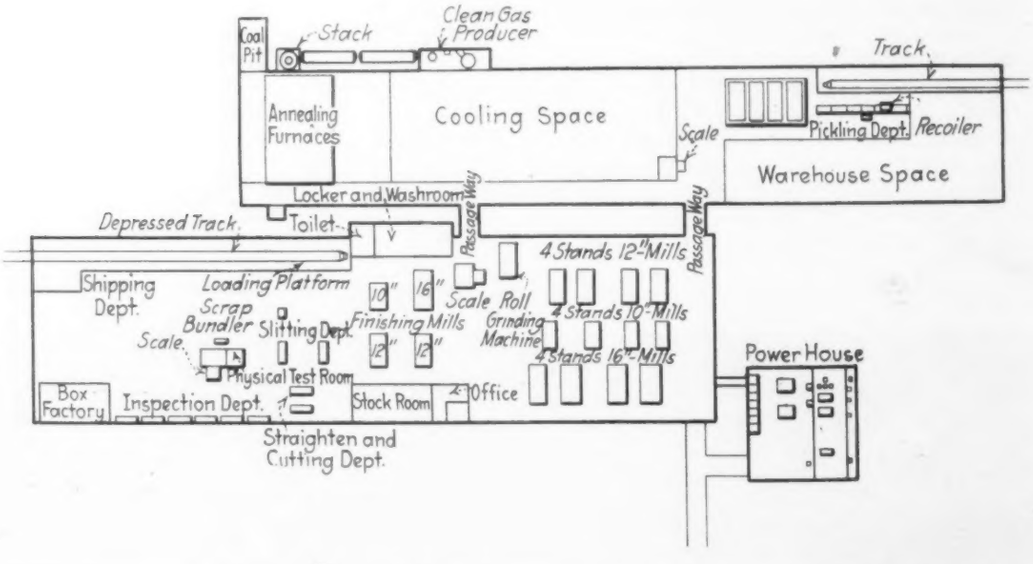
Since the completion of the hot strip mill, the company has transferred 48 of its 57 cold rolled strip mills at the Chicago plant to Riverdale and eventually will move all of them there, leaving the Archer Avenue works for the fabrication of manufactured products only. The capacity of the old cold strip mills is 25,000 to 30,000 tons per year, whereas the new cold rolled plant just finished at Riverdale will have a maximum annual output of 30,000 tons, increasing the company's total capacity to approximately 60,000 tons.

Further expansion of cold rolled capacity was dictated not only by heavier demand for the company's own manufactured products but by steadily increasing consumption by other users, notably the automobile, furniture and hardware industries. All forms of cold rolled strip are rapidly finding new uses. One form for which there has been a particularly rapid increase in demand is electro-galvanized cold rolled strip, used in the manufacture of armored cable and flexible metal hose.

The new cold rolled mill commands especial attention because it will produce any gage, any edge, any finish and any temper up to 18 in. wide. Coils are usually burlaped, while flat strips cut to length are generally packed in boxes lined with oiled paper. The building containing the cold rolling stands has continuous sash in the side walls and monitor lights equal in area to 48 per cent of the floor space. The best of natural illumination was deemed necessary in view of the high grade of work which must be done to meet the demands of the trade.

The breaking down mills include four continuous two-high 10-in. stands, four continuous two-high 12-in. stands and four continuous two-high 15-in. stands. Each stand is individually driven by a variable speed motor running on 250-volt direct current. Control has been provided both from a central push button station and by push buttons on each housing. Both control systems are connected to the electrical control apparatus, which is carried on a platform hung from the ceiling. On each housing are four push buttons, one for starting, one for stopping and two for intermediate speeds. The 10-in. stands are driven by 100-hp. motors, the 12-in. by 150-hp. motors and the 16-in. by 250-hp. motors. All of the electrical equipment was furnished by the General Electric Co.

The Mill Building Has Window Space Equal to 48 Per Cent of the Floor Area. The long side shown is of temporary construction with wood, instead of brick, trim to permit later extension. Barely visible above the roof of the mill structure is the monitor of the pickling and annealing building



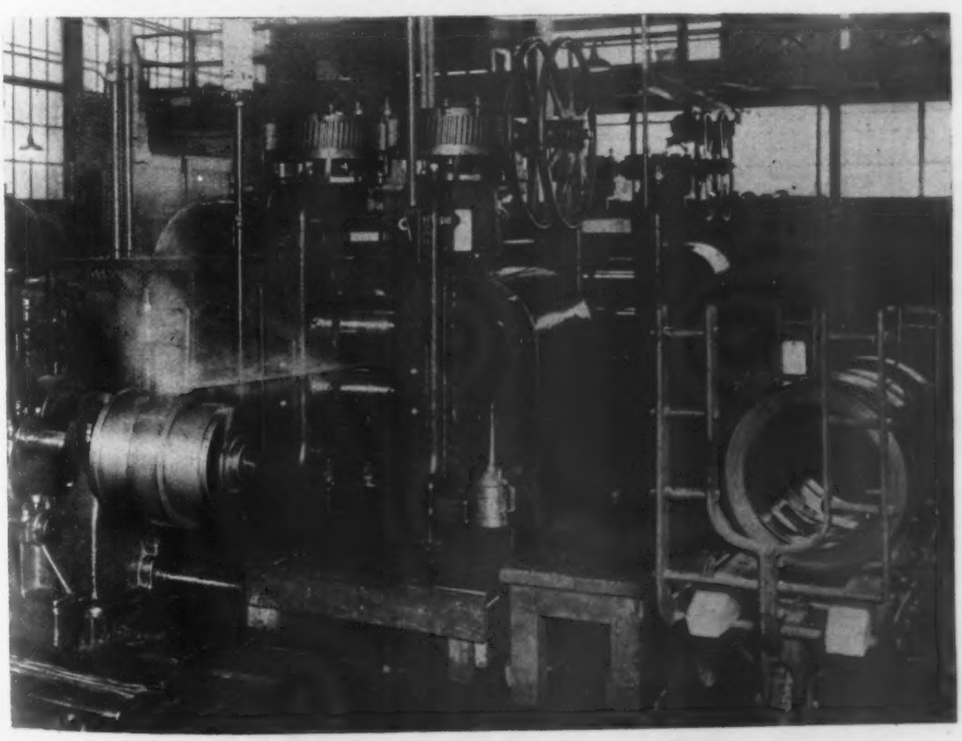
The 12-in. and 16-in. mills may be run either in sets of two stands or four stands. Take-up blocks and three roll coilers for coiling strip as it issues from the stands are situated between the second and third stands and immediately following the fourth stands. The 10-in. stands may be run singly or in sets of two, three or four, take-up blocks and roll coilers having been supplied following each stand.

The finishing mills include one 16-in. stand driven by a 250-hp. motor, a 10-in. stand driven by a 100-hp. motor, and two 12-in. stands driven by 150-hp. motors. The latter two stands may be run singly or in tandem. The motors are of the variable speed type and through rheostat control a nicety of adjustment in rolling speed is obtained. All of the motors, both for the

One Stand of the 12-In. Finishing Mill, Equipped with Individual Variable Speed 150-Hp. Direct-Current Motor and Rheostat Control

roughing and finishing stands, have a range of speed of from 400 to 800 r.p.m. The rolling speed of the mills varies from a minimum of 90 to a maximum of 180 ft. per min. The stands were constructed by the E. W. Bliss Co., Brooklyn, N. Y.

Other equipment in the mill includes three slitting machines, of which two were built by the E. W. Bliss Co. and one by the Waterbury Farrell Foundry & Machine Co., two straightening and cutting machines by means of which strip is straightened and cut to length, which were constructed by the Hallden Machine Co., Waterbury, Conn., and a breaker and an edging machine, both built by the Broden & Dailey Construction Co., Cleveland. There is also an automatic 20 x 96-in. roll grinding machine, built by the Landis Tool Co., Waynesboro, Pa., which automatically grinds a convex or concave surface on a roll as desired. By changing gears, the degree of "crown" or "concave" in a given operation may be closely regulated. A crown of 0.002 or 0.010 in. or any other crown or concave which is regarded as desirable may be made. For repair purposes a number of miscellaneous machine tools have been provided. All equipment in the mill has individual motor drive. For changing rolls and miscellaneous material handling a jib crane storage battery truck, manufactured by the Elwell-Parker Electric Co., Cleveland, is used. The jib crane has a capacity of 3000 lb. at a radius of 6 ft.



The First Two Stands of the Continuous 12-In. Roughing Mill. Each stand is individually driven by a variable speed motor. Control is provided both from a central push button station and by push buttons on each housing

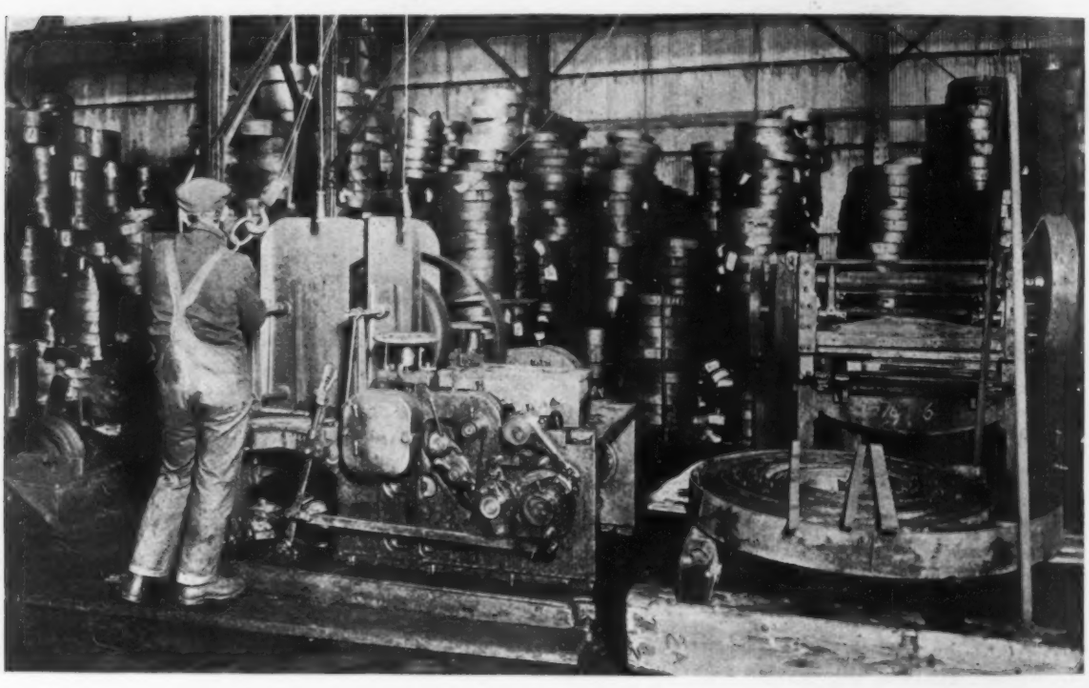
At the finishing end of the building is an inspection department where facilities have been provided for determining tensile strength for Brinell and scleroscope hardness testing and the Erickson cupping test. The inspection department is equipped for boxing and burlaping materials preparatory to their delivery to the trade. A depressed track long enough to accommodate four freight cars facilitates the transfer of steel from the floor into the car doors. A degressed motor truck entrance has also been provided. Both the freight car and the automobile truck entrances have rolling steel doors which shut off the shipping department from the outside elements.

The floor of the mill is of wood block laid on concrete. All of the roll stands and the heavier complementary equipment are anchored in suitable concrete foundations. A mechanical blast system is used for heating and ventilation. Three heat chambers containing steam coils, each served by a Buffalo Forge Co. motor-driven fan, are hung from the roof trusses. Heat is driven from the chambers through pipes to suitable outlets at various points distributed about the room. In summer when the steam coils are idle the same system is used for ventilating. Adjoining the mill is a two-story locker and wash room for the convenience of employees.

The mill building is of fabricated steel construction with brick trim and continuous sash in the side walls and monitors. One side, which is of temporary construction to permit later extension, has wood trim. The roof is of wood with standard composition roofing. The roof is a flat arch and the monitors, which are shallow, are wider than the intervening valleys.

Adjacent to and connected with the mill is a building, 75 x 420 ft., containing the pickling and annealing department. This structure is constructed of fabricated steel with sheet metal walls and roof. At one end is located a five-chamber coal-fired Smallwood annealing furnace built by the American Industrial Furnace Co., Boston. Grooved tracks, which have been laid leading into each oven, carry large cast-iron balls on which annealing boxes are placed. For charging the boxes into the ovens a charging rack built by the United Engineering & Foundry Co., Pittsburgh, has been provided. The rack may be set down between any row of "cannon balls" and it will mesh with a pinion on a motor-driven shaft situated crosswise in front of the furnace doors. Once engaged to a pinion the rack shoves the annealing box into the oven. It is likewise used for withdrawing the box after annealing.

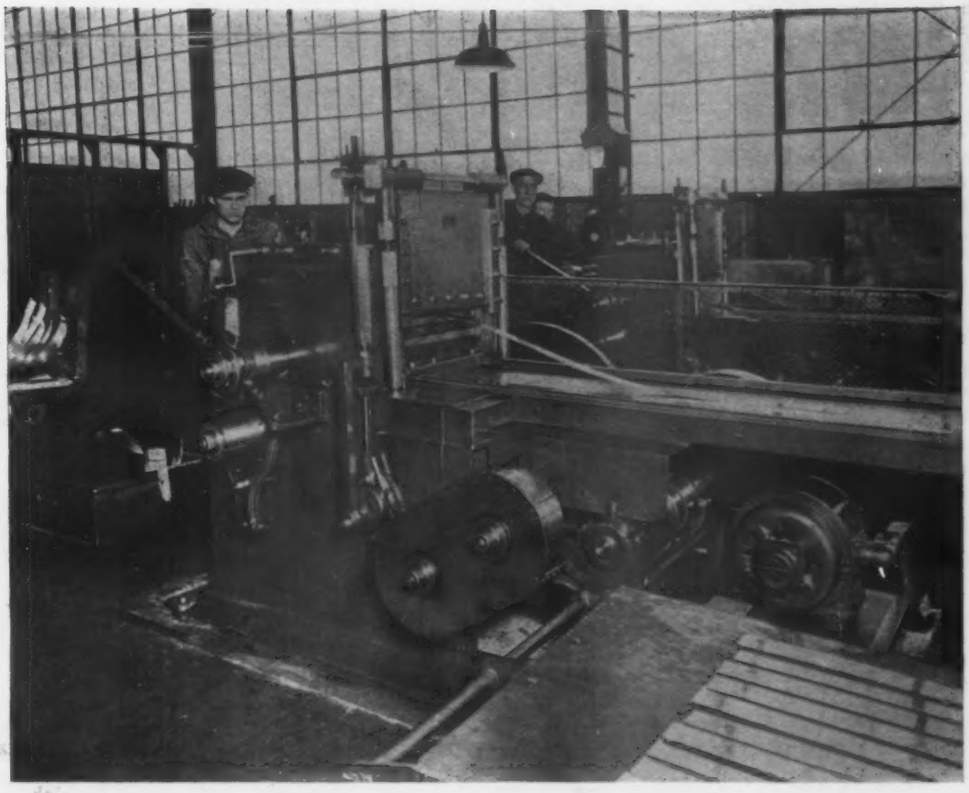
After withdrawal the boxes are picked up in a grappling device and distributed by overhead crane to various points on a large cooling floor which is covered with sand. The grappling device was designed by the United Engineering & Foundry Co. and was constructed by the Vierling Steel Works, Chicago.



The Recoiling Machine, Designed and Built by the Acme Organization, Automatically Opens the Coils of Hot Strip in Spiral Form. "Hairpins" are then hung over the edges of the steel to preserve the spread in the coil so that all surfaces will be exposed to the action of the acid during pickling

Two types of covers and bases for annealing boxes are used, one type built by the United Engineering & Foundry Co. and the other by the Union Steel Casting Co., Pittsburgh. In both cases the base is long enough to carry two covers. After strip has been placed in the boxes for annealing, the open space between the base and covers is sealed with sand to exclude the air.

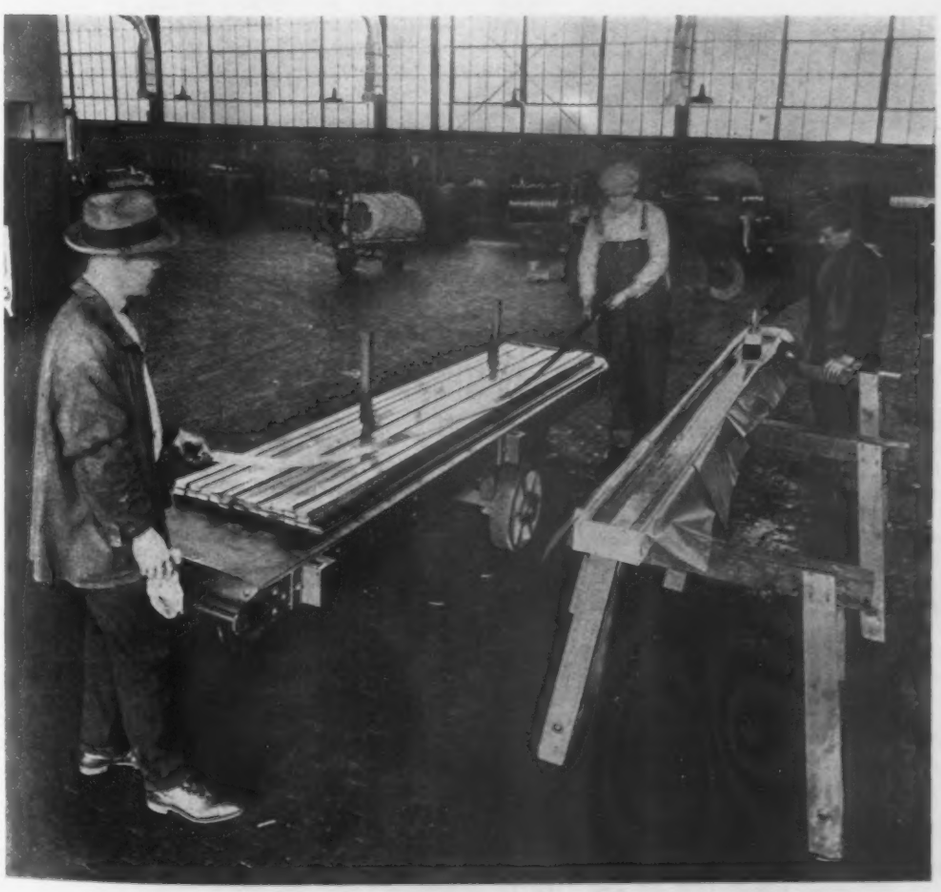
A particularly interesting feature of the annealing department are facilities for cooling which make subsequent polishing or buffing operations unnecessary. In other words, cooling is accomplished without losing the bright finish of the strip. For this purpose there is an atmospheric gas producer with necessary scrubbing and cleaning equipment, built by the Flinn & Dreffein Co., Chicago. The gas, which must be free from sulphur, moisture, any tar products, or any other element which would tarnish the strip, is conducted through pipes laid under the sand to various points on the floor where connections are made with the covers of the annealing boxes. The gas is introduced into a box immediately after its withdrawal from the furnace and the connection is not broken until the



The Machine in the Foreground Is the Latest Type Heavy Duty Automatic Straightening and Cutting Machine, With a Capacity up to 18 In. Wide By ⅛ In. Thick. In the background is a smaller machine of the same type

charge is cool. The gas, by excluding the atmosphere during cooling, protects the steel from the oxidizing effects of the air as well as from tarnish or rust from moisture of either air-borne elements. The cooling gas is produced from coke. A Broden & Dailey oiling and buffing machine is used for oiling strip after annealing or for buffing it if the customer so specifies.

At the other end of the building is a railroad switch track by means of which cars of hot rolled strip are delivered. Coils of strip are transferred by overhead traveling crane to a storage pile. The steel comes in tightly wound coils and it is therefore necessary to open them up so that in pickling all surfaces of the steel may be cleaned. To accomplish this the company designed and built a recoiler which automatically opens the coil in a spiral form. After recoiling, "hair-



Unusual Care Is Exercised In Preparing Goods for Shipment. The workmen are packing 0.035 x 2-in. x 12-ft. strip in a box lined with oiled paper. Oil is also applied with a brush to each layer of strip as it is placed in the box

pins" are hung over the edges of the steel to preserve the spread in the coil. A monorail hoist is used to transfer coils to wooden cradles which are then lifted by overhead crane and immersed in the pickling tubs. There are three wooden tubs, with foundations for one more, and each is 20 ft. long by 6 ft. wide and 6 ft. deep. The steel is first lowered into an acid pickling tub, following which it is immersed consecutively in cold and hot water rinsing tubes.

After pickling, the individual piles of coils are lifted off the cradle by a lift truck built by the Automatic Transportation Co. and conveyed to the cold mills. For transporting strip from the mills to the annealing department special buggies have been provided. Constructed by the Broden & Dailey Construction Co., they rest on a two-wheeled carriage with a small wheel arranged under the center line at each end, so that three of the four wheels are in contact with the floor at all times. When pushed, the forward small wheel engages the floor and when pulled the nearby small wheel is in contact. This arrangement facilitates the turning of corners and makes possible the coupling together of trains of from five to ten buggies at a time. The trains are pulled by Automatic Transportation Co. storage battery tractors. To permit the easy handling of the tractors and buggies all of the floor of the annealing and pickling room, save that occupied by the hot rolled strip storage and the cooling department, is laid with wood block.

A review of the material handling equipment would be incomplete without mentioning a 30-ton electric crane commanding the annealing end of the building and a 10-ton electric crane at the pickling end. Both were constructed by the Whiting Corporation, Harvey, Ill., and travel on the same overhead runway.

Power used in the mill and the annealing and pickling building is supplied from a substation, 60 x 60 ft., which is of brick construction with Federal cement tile roof. Here 12,000-volt alternating current, purchased from a public service company, is converted to 250-volt direct current. Equipment includes two 1000-kva. transformers and two 1000-hp. rotary converters.

BETHLEHEM MERGER CASE

Hearing by Federal Trade Commission Continues at Federal Building, New York

The Federal Trade Commission's hearing regarding the Bethlehem-Midvale-Lackawanna merger, which opened at the Federal Building, New York, on Monday, Jan. 21, will continue for at least a month. The witnesses examined during the past week were purchasing agents or executives in touch with the purchasing department of several companies which buy steel products.

As in the hearings in other cities, the examination as conducted by Baldwin S. Bane, counsel for the Federal Trade Commission, aims to develop whether the absorption of the Midvale, Cambria and Lackawanna properties by the Bethlehem Steel Corporation has in any way stifled competition in the steel industry.

Witnesses were examined as to their source of supply previous to and following the steel merger. Five days' examination failed to bring out any startling developments.

R. C. Miller, purchasing agent of the Staten Island Shipbuilding Co., Staten Island, New York, testified to recent quotations he had received on plates, shapes and bars. He said that in late December and again early in January he had quotations of 2.35c., Pittsburgh, on all three products, though some companies quoted 2.40c. He also said that he had later received a quotation of 2.30c., Pittsburgh, on plates.

Other witnesses were C. E. Stafford, president Turl Car & Iron Co., Newburgh, N. Y.; George Lund, Post & McCord, steel erectors, New York; Eugene T. Gray, secretary Gould Coupler Co., Depew, N. Y.; Louis F. Stagg, Snead & Co., Jersey City, N. J.; Harry C. Harrington, purchasing agent of Railway Steel Spring Co.

Mr. Lund of Post & McCord testified that 90 per cent of its steel contracts are placed with the American Bridge Co. He, in describing the methods employed in bidding on structural steel work in the New York territory, said that Bethlehem H sections were specified on a considerable part of the work. He mentioned Hay Foundry & Iron Works, Harris Structural Steel Co., Levering & Garrigues Co. and A. E. Norton, Inc., as some of Post & McCord's most active competitors. Mr. Lund was questioned as to whether he had ever heard it said that his firm was owned or controlled by the United States Steel Corporation. He said he had heard the report and added that there is no truth in it.

Mr. Stagg said that before the merger the principal competitors for his business were the Bethlehem and Midvale companies, but that since the merger he has usually bought from Bethlehem. He said it was an advantage to buy from a company that can furnish both shapes and bars.

Mr. Harrington said that the Bethlehem and Midvale companies had competed with Carnegie Steel Co. for the spring steel orders of the Railway Steel Spring Co. He said that most of the company's orders are placed with Carnegie. He testified that recent quotations submitted to him were 2.40c., base, Pittsburgh, but that after negotiation he succeeded in buying at 2.30c., base, Pittsburgh.

Two New Blast Furnaces Planned at Buffalo

BUFFALO, Jan. 28.—Construction of two new blast furnaces and a battery of by-product coke ovens may be a future development at the North Tonawanda pig iron plant of the American Radiator Co. Of the two furnaces now at Tonawanda, it is said one will be dismantled and the other will be remodeled into a 400-ton stack with skip hoist. More immediately in prospect are the installation of a bin system and the construction of an ore bridge for which contracts will be let later this month. Local officials admit the plans for two new furnaces, making three in all, and admit the plans for the coke ovens, but state that these particular improvements will not be made immediately.

Ashtabula Steel Co. Addition

Since the Davey organization acquired control of the Ashtabula Steel Co., Ashtabula, Ohio, the plant has been running to full capacity. The company is entirely sold up for first quarter of 1924. Contracts have recently been let for the erection of a complete new finishing department, consisting of Mesta picklers, cold-roll drive, cranes, and other equipment. After the completion of this new addition, the company will enter the automobile or high finish sheet field in which experience was obtained at Mansfield, Ohio.

Reestablishes Machine-Tool Selling Agency

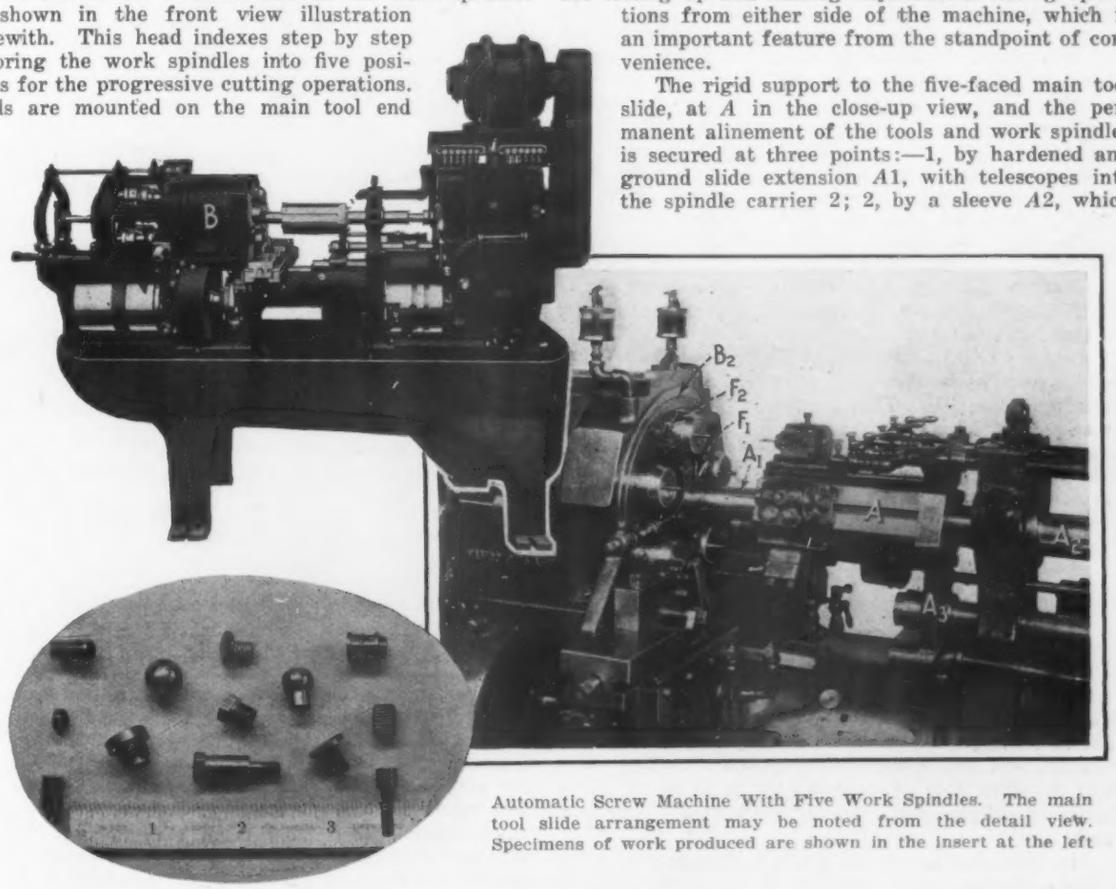
The Dale Machinery Co., New York and Chicago, which has reengaged in business as a machine-tool selling agency, has been appointed sales representative in the New York and Chicago territories by the Milholland Machinery Co., Indianapolis, Ind., turret lathes and screw machines; Massillon Foundry & Machine Co., Massillon, Ohio. power hammers, trimming shears, etc.; Blomquist-Eck Machine Co., Cleveland, horizontal boring machines.

FIVE-SPINDLE AUTOMATIC

Increased Production, Close Accuracy and Wider Scope Claimed for Screw Machine

The National Acme Co., Cleveland, has brought out a 9/16-in. five-spindle Acme multiple spindle automatic screw machine designated as the 9/16 in. model C. Many refinements in the application and support of important mechanisms, rearrangement of working parts and materials of improved quality, are incorporated in the new machine, with the intention of providing increased production, a high degree of accuracy and of broadening the scope of the machine. Probably the most notable departure from the standpoint of adaptability is the use of five work spindles as compared with the four spindles heretofore employed.

In general the multiple spindle design is similar to that of the company's four spindle machines. As in the earlier models a spindle carrying head mounted on the end of the machine encases the work spindles as shown in the front view illustration herewith. This head indexes step by step to bring the work spindles into five positions for the progressive cutting operations. Tools are mounted on the main tool end slide and cross slides to complete the work in the time of the longest single operation or fraction thereof, governed, of course, by the divisional operation of the tool set-up. Power application for the spindle drive is through a pulley shaft connected to a center shaft which runs through the main tool slide to spindles in the spindle head. Interchangeable back gears are used for varying spindle speeds as heretofore. The camshaft derives its power from a central source through the clutch shaft for fast and slow feeds to a worm operating the main camshaft with drums which are controlled by the standard Acme system of change gears. Single belt or motor drive is optional.



Automatic Screw Machine With Five Work Spindles. The main tool slide arrangement may be noted from the detail view. Specimens of work produced are shown in the insert at the left

Among the special features it may be mentioned that a sturdy foundation is provided in order to secure accuracy in the product which depends on the maintaining of precision of alinement between the tools and the work. The frame has five upright main supports and these rest on nine pedestals cast in the bed or pan. This frame construction provides five substantial bearing supports to the main camshaft which runs clear through the machine. The drums on the camshaft are well under the bed construction so that the camming for feeds of the main tool slide, indexing of the cylinder and stock setting is accomplished by the direct application of rolls from the drums, an arrangement intended to give positive action and avoiding the spring tendency of levers.

An important feature is the elimination of moving drums, gears or other operating mechanism in the section under which the cutting operations are performed, which removes the danger of chips clogging in the drums and gears and causing interference, inaccuracies and accidents. Attention is also called to the oval form of the bed beneath the main slide which permits chips to fall clear of the tools into the heavy pan beneath.

The machine also departs from the previous models in the use of right-hand tools exclusively. It has a telescopic main tool slide and supporting members, the lengthening of the tool carrier proper permitting the mounting of the tools one back of the other. The open area around the main tool slide provides access for tooling up and making adjustments during operations from either side of the machine, which is an important feature from the standpoint of convenience.

The rigid support to the five-faced main tool slide, at *A* in the close-up view, and the permanent alinement of the tools and work spindles is secured at three points:—1, by hardened and ground slide extension *A*1, with telescopes into the spindle carrier 2; 2, by a sleeve *A*2, which supports the rear, and is mounted in a heavy bearing on the frame, and 3, as a further resistance to side thrust, by an extension of the pusher rod into the upright frame column *A*3 independent of the carrier proper. This extension travels along a hardened and ground steel plate through the center of the bed as shown. The slide pusher shaft also has its bearing in the frame and is directly operated by a cam on the main cam drum shown in the front view illustration.

The spindle carrier and casing, *B* in the front view illustration, is of an improved type. The cylinder member is supported in bearings at either end with a total bearing surface equal to one-half the length of the cylinder. In the cored spacing between the five ribs which connect the bearing surfaces the spindle drive gear is located on the drive shaft which extends through the tool slide. At the front and rear on top of the spindle carrier bearings independent shoes also provide take-up for the cylinder and casing, should this be necessary because of excessive wear. The casing is also counterbored at the front and the

cylinder set into the casing as at *B2* in the close-up view, for its entire periphery, thus affording resistance to end thrusts. Take-up is provided in the rear of the casing by three bronze shoes.

The spindle drive indexing mechanisms are located between the spindle bearings instead of at the end of the spindle carrier. This improvement over earlier models is said to permit lengthening of the distance between the spindle bearings, and at the same time the shortening of the rear overhang of the spindles where they extend through the spindle carrier. The long spindles in the spindle carrier are fitted with bronze bearings and run in hardened, ground and lapped steel bushings. The spindle drive gears are hardened spiral gears with end thrust bearings. The point is emphasized that this type of spindle construction and drive assures a constant smooth and quiet power application so that with ample lubrication and easy adjustment for take-up, close running bearings and consequently rigid spindle alinement are thereby secured.

With a production capacity of 3000 pieces per hour, which necessitates the indexing of the spindle carrier at the rate of approximately once every second, the importance of avoiding strain at the pick-up or shock at the stopping point during the operation of indexing becomes apparent. Accordingly a unique modification of the Geneva movement is provided. The mechanism is so arranged that when the cam on the main camshaft engages progressively with three rolls on the index gear, which in turn meshes with the cylinder to index one-fifth of its circumference, the spindle head becomes engaged without shock, turns rapidly and de-celerates at the point of locking without excessive strain or shock. This is referred to as one of the most important features that affects permanency of contacting units.

Another feature is security in locking the spindle carrier in positive alinement with the tools after each indexing operation. This is accomplished by a new arrangement of a lock and latch bolt system. The latch bolt is located at the rear of the machine and the lock bolt on the front. When the lock bolt is withdrawn by a positive cam from one of the five notches in the cylinder at the instant of indexing the latch bolt rides up to the slot on the opposing side of the head and springs into position at the next slot. Simultaneously the lock bolt which has a tapered face is firmly settled into position by a positive cammed action without the use of springs. In this manner both the lock and latch bolts have a tendency to pull the cylinder down toward the central bed construction, firmly fixing the relative position of spindles to tools, thus assuring work concentricity for both side and end operating tools.

The cross tool slides are mounted on hardened and ground steel plates attached to the bed instead of on bearings planed in the bed itself so that the bed casting is not affected by wear. The forming and cut-off slides are of the same size and construction so that they may be used for mounting double deck tools. The forming slide has an independent stop.

Drawback collets are used, reducing the overhang of spindles at the point of tool application. The use of tools is not limited to four positions but is available for all five spindles. Stock can be fed in either the first or fifth spindle position. Improved protective devices are provided for the stock feed tube control as well as a hand chucking device.

Tools and attachments used on the machine may be purchased as required. For example, the threading spindle is a separate mechanism supplied from stock and is applied without fitting. Accelerated reaming and drilling attachments as well as taper turning, boring and other tools adapted for forming, knurling and shaving will be supplied from stock in various combinations. All holes, bearings, bosses, etc., to receive such equipment are on the machine for their installation. The number of cam changes has been reduced to a minimum of forming, cut-off and lead only. Hence as it is pointed out the machine offers very broad tooling possibilities.

The capacity of chuck is, round, 9/16 in.; square, 25/64 in.; hexagon, 31/64 in. The length of feed, 5 in., and the length of regular turning, 4½ in. The machine occupies a floor space 2 ft. 8 in. by 7 ft. Its height, belt driven, is 4 ft. 10 in. and motor driven 5 ft. 10 in.

To Manufacture Special Wire

The Wheeldon Wire Co. has been organized at Worcester, Mass., headed by John Wheeldon, recently general manager of the Wickwire-Spencer Steel Corporation, and will manufacture special fine steel wires from Swedish rods in the factory building at West Brookfield, Mass., formerly occupied by the Quabaug Corset Co.

The business has been recently incorporated with a Massachusetts charter and the capital stock is $150,000. The property has been bought, giving 40,000 sq. ft. of manufacturing space, and the work of equipping it is already under way. Manufacturing will begin about March 1.

The officers of the company are: President and treasurer, John Wheeldon; vice-president, Phillips B. Marsden; clerk, George A. Gaskill; directors (all of Worcester), the above officers and Herbert Midgley, president and general manager Howard Brothers Co.; J. Verner Critchley, president and general manager Reed-Prentice Co. and Walden-Worcester, Inc., and Granby A. Bridges, treasurer Williams & Bridges Co. Mr. Marsden is superintendent of the Howard Brothers Co.

Mr. Wheeldon is one of the best known wire men in the country. He had been with the Spencer Wire Co. and its successor, the Wickwire-Spencer Steel Corporation, for eight years, the last two years as general manager, and previously had been with the American Steel & Wire Co. as superintendent of the Cleveland and New Haven plants and of the South Works, Worcester.

Spanish Iron Ore Industry Active

There was a decided increase in the shipments of iron ore during December, 1923, from the Bilbao region of Spain due to the British demand, Commercial Attaché C. H. Cunningham reports in a cable to the Department of Commerce. The outlook for the iron and steel trade is encouraging, judging from the unfilled orders which have been accumulating for 10 months. Anticipated orders for railroad materials indicate opportunities for American manufacturers.

First Dutch Blast Furnace Goes In

The first blast furnace in Holland was blown in at Ijmuiden on Jan. 22. The furnace has a capacity of 350 to 400 tons per day and was built for the Koninklijke Nederlandsche Hoogovens en Staalfabricken (Royal Dutch Blast Furnace & Steel Co.) by Freyn, Brassert & Co., Chicago. A second furnace of the same type is being built for that company at Ijmuiden by the Chicago engineers.

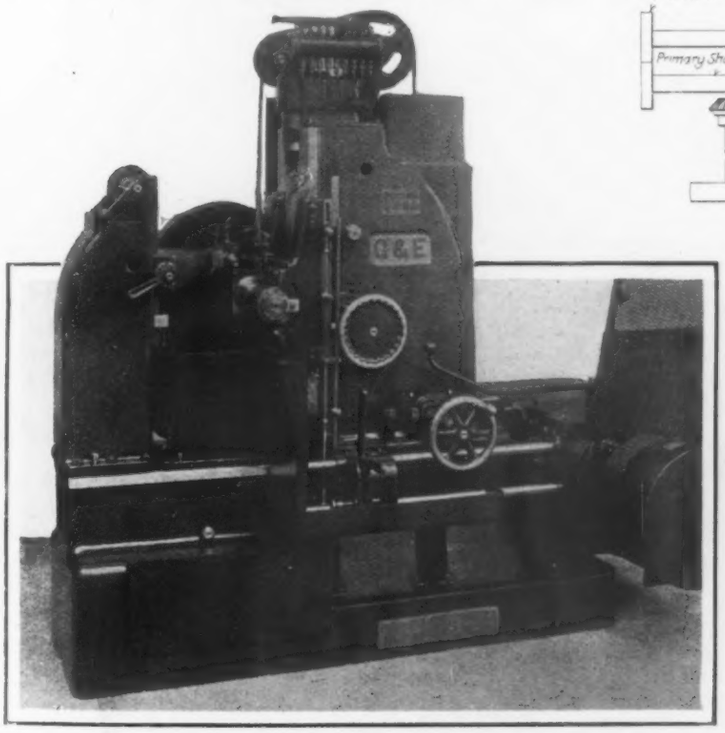
The protection afforded a manufacturer against use by a competitive concern of a company name intended to allow the company to masquerade as the same or as a component part of the original company is shown in the case of permanent injunction granted against a company, which, by employing in its name and as a designation of its product the word "Bosch," was regarded as unlawfully interfering with the business of the American Bosch Magneto Corporation.

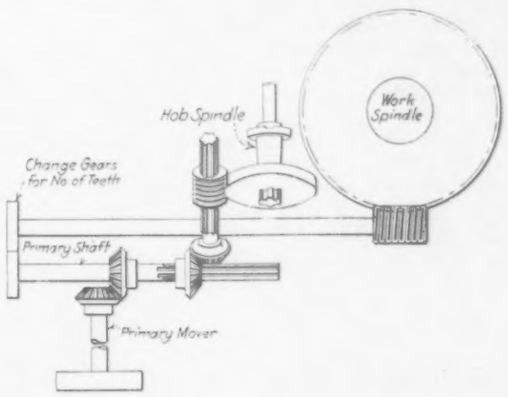
NEW GEAR HOBBER

Machine for Quantity Production of Spur and Helical Gears—Drive Arrangement a Feature

A manufacturing hobbing machine designed to rough or finish either spur or helical gears in quantity and readily adaptable to a diversified range of work has been brought out by Gould & Eberhardt, Newark, N. J.

The construction of the machine, which is designated as the No. 16 HS., may be noted from the accompanying illustration. Particular attention to the proportions and arrangement of the component parts has been attempted, in order that high production of closely accurate gears would be maintained at fast feeds and speeds. The ample proportioning of vital parts and provision for quick and easy adjustment to compensate for wear, maintaining the accuracy of the machine, are features.





Manufacturing Hobbing Machine for Roughing or Finishing Either Spur or Helical Gears. The arrangement of the drive, shown in the diagram above, is a feature, also the convenient adjustment provided to compensate for wear. A fixed angularly positioned cutter spindle or one with slight angular adjustment may be provided. The velocity diagram above shows the angular velocity ratio between cutter and work spindles

The arrangement for transmitting power to the cutter and the work spindle is a feature and due regard has been given to the flexibility required to cut spur or helical gears of different numbers of teeth and pitches. The point of application of power delivered to the gear train between the two spindles is arranged so that delivery of power to the work spindle and to the hob spindle is substantially equalized, with the object of utilizing and balancing the normal backlash of parts.

The arrangement of the drive is shown diagrammatically in the accompanying illustration. The power is transmitted by means of three shafts and four pairs of gears, each spindle being driven from the prime mover by two pairs of gears, one pair of which consists of a worm and worm wheel. The worm wheels are mounted directly on the spindles. The uniformity of the angular velocity ratio between the cutter and work spindles obtained by the arrangement of the power transmission described may be noted from the accompanying velocity diagram.

Gears are of alloy steel, heat treated and are connected to their respective shafts by multiple splines. The index and cutter spindle worms are glass hard and are ground to extreme accuracy. The cutter spindle worm wheel is of bronze alloy and the index worm is of chilled cast iron.

Controls are grouped to permit of maximum operating convenience. There are three operating levers, one of which controls the main clutch for starting and stopping the machine. Another controls the power traverse in either direction for the cutter carriage, and the third is used to start and stop the feeding motion of the cutter. A hand wheel is provided for moving the cutter carriage for small adjustments, and another for positioning the stanchion for the proper depth of cut or for different diameters of blanks.

Power traverse at 100 in. per min., to move the cutter rapidly in either direction, is provided and may be operated whether the work and cutter spindles are rotating or idle. The rapid traverse operating lever is interlocked with the feed lever, so that neither the feeding nor the power traverse movement to the cutter slide can be started without the other movement having been first disconnected. Provision is made to prevent accidental operation of the rapid power traverse in the downward direction.

Fixed stops determine the extreme movement, in either direction, of the power traverse to the cutter, and automatically stop the movement. An adjustable stop limiting the upward movement of the cutter carriage permits of stopping the cutter at the position most convenient for the loading and unloading of the blanks.

A bell crank and cam device arranged in conjunction with the cutter carriage provides for disconnecting automatically the power downward traverse at any predetermined point in its travel, a feature intended to permit of rapidly positioning the hob for cutting. This device also prevents engagement of the power downward traverse during the cutting operation. When properly adjusted the cam device is said to permit the

operator to bring the cutter to the cutting position without danger of injuring the hob or the blank. The feed may then be started and a stop adjusted to limit the extent of the feeding movement.

Automatic flood lubrication is provided, the lubricant being pumped to an elevated reservoir from which each bearing and gear is flooded. The stanchion is equipped with a multiple gravity oiler from which lubricant is fed to the moving parts in that unit. Sight-feed oil cups are used for the cutter spindle and carriage units.

The cutter spindle is of alloy steel, heat treated, and has a glass-hard taper portion on one side of the hob and glass-hard cylindrical part on the other side, both running in bronze bushings. The cutter spindle is secured against endwise movement at a point close to the hob, eliminating, it is claimed, axial movement of the hob by the elongation of the spindle when running warm. Separate adjustment is provided for the taper diametrical fit of the cutter spindle which is independent of the adjustment for end fit. The large spindle head is intended to assure accurate clamping of the cutter. The work spindle revolves in a long taper bushing. The fit of the work spindle is adjusted by means of a worm located beneath the spindle head, the worm actuating a nut and moving the bushing in an axial direction. Independent adjustment is provided for the end fit of the spindle.

The outer support for the work arbor is of box section and is secured directly to the base. The arbor supporting arm is slidably arranged on the outer support, and may be moved upward and swung out of the way to permit removal of blanks.

The machine may be equipped with a fixed angularly positioned cutter spindle for either spur or helical gears of a given pitch, or a cutter spindle with slight angular adjustment for spur and helical gears of different pitches. It is rated to cut gears up to 3 diametral pitch in steel, 18 in. in diameter and 14 in. face. Ten cutter speeds from 50 to 225 r.p.m. are available, and feeds from 0.01 to 0.25 per revolution of blank can be provided. Change gears to cut numbers of teeth from 3 to 50 can be furnished. With slight alterations gears with teeth ranging from 3 to 160 can be cut or a range of 6 to 200 or more can be arranged for.

The weight of the machine is 6500 lb., and the floor space occupied is approximately 53 x 84 in. The machine may be driven by a single pulley, belted directly to a line shaft, or driven by a motor.

Shipbuilding Gains in America, but Falls Off Abroad

The shipyards of the world last year launched less than half as much tonnage of merchant vessels as they did in the last pre-war year, 1913, says a statement just issued by Lloyd's Register of Shipping, covering returns from all maritime countries for 1923. Compared with launchings for 1913, aggregating 3,332,000 gross tons, it is pointed out, last year's total was only 1,643,000 tons.

Last year's figures, Lloyd's Register adds, also show a sharp decline from those of the previous year, and, with the exception of 1915, are the lowest on record since 1909. And, excluding these two years, the 1923 total is lower than for any year since 1897. It should be noted, however, that the returns showing tonnage under construction at the beginning of this year showed some increase over the quarter ending Sept. 30 last.

The falling off in construction work last year was general, the only country for which an increase is reported being the United States, where about 53,000 gross tons more were launched than in 1922. This, however, compares with a decrease of about 385,000 tons for Great Britain and Ireland and of almost half a million tons for all the other shipbuilding countries combined. Lloyd's Register gives the following table, showing the total of launchings for the two years, in gross tons:

	1923	1922
United States	172,817	119,138
Great Britain and Ireland	645,651	1,031,081
Other Countries	824,713	1,316,865
World total	1,643,181	2,467,084

The increase in the American output last year marks the first break in a continuous period of decline since 1919. World ship construction last year was less than a quarter of that for the record year, 1919, when 7,144,000 gross tons of merchant shipping was sent down the ways.

Improved Labor Conditions in Pennsylvania

HARRISBURG, PA., Jan. 28.—Improved conditions in the iron and steel industry in Pennsylvania are noted in the semi-monthly report of the employment division of the Department of Labor and Industry to the secretary, Dr. Royal Meeker.

Erie reports that there has been slight improvement, and that several shops have re-hired men dropped some time ago. There, however, is still a surplus of skilled and unskilled workmen. Unusual activity is indicated in the reports coming from the Harrisburg district. The outlook in the Johnstown district is reported encouraging.

In Philadelphia the only heavy lay-off has been that by the Baldwin Locomotive Works. Men capable of doing work on ships are in demand. The Ingersoll-Rand Co., Easton, has added a number of general machinists, and the Federal Shop at Kearny, N. J., has employed a number of boilermakers. Pittsburgh has a surplus of workers, but these are principally men of limited experience or men trained only in the operation of a single machine. An early increase in the demand for workers is anticipated.

Non-Ferrous Exports and Imports

Figures for the first 11 months of 1923, issued by the Department of Commerce, show United States imports and exports during that period of aluminum, antimony, cobalt, copper, brass, lead, mercury, nickel, tin, zinc and other materials of similar nature. The principal items are covered in the appended table.

United States Trade in Non-Ferrous Metals and Minerals
Net Tons in First 11 Months of 1923

	Imports	Exports
Aluminum: Bauxite ore	114,109	82,038
Metal, scrap, etc.	20,117	341
Manufactures	988	4,135
Antimony: Ore (antimony content)	881	.....
Metal, etc.	7,016	.....
Cobalt: Ore and metal (content)	139	.....
Copper: Ore (copper content)	40,337	.....
Concentrates (copper content)	22,781	170
Regulus, etc.	1,481	.....
Refined, in ingots, etc.	54,437	323,156
Unrefined and converted	187,921	.....
Old and scrap	2,617	1,608
Manufactures	2,166	34,836
Brass: Old and clippings	20,053	5,321
Manufactures	290	7,514
Lead: Ore and matte (lead contents)	28,957	.....
Bullion or base	72,513	.....
Pigs, bars, etc.	21,066	42,464
Manufactures	3,654	3,444
Mercury:	686	12
Nickel: Ore and matte (nickel content)	6,709	.....
Monel metal and alloys	.....	375
Manufactures	11,876	237
Tin: Ore (content)	4,607	.....
Bars, blocks, pigs	70,636	799
Manufactures	131	4,168
Zinc: Ore, etc. (content)	1,271	13,998
Cast blocks, pigs, etc.	21	47,069
Manufactures	51	7,260
Cement, hydraulic	295,952	173,186
Magnesite	75,765	.....
Graphite or plumbago	18,309	.....
Mica	3,379	846
Emery ore, corundum, flint	26,293	.....
Asbestos unmanufactured	193,513	.....
Artificial abrasives	40,685	18,716
Lime and limestone	22,816	109,589*

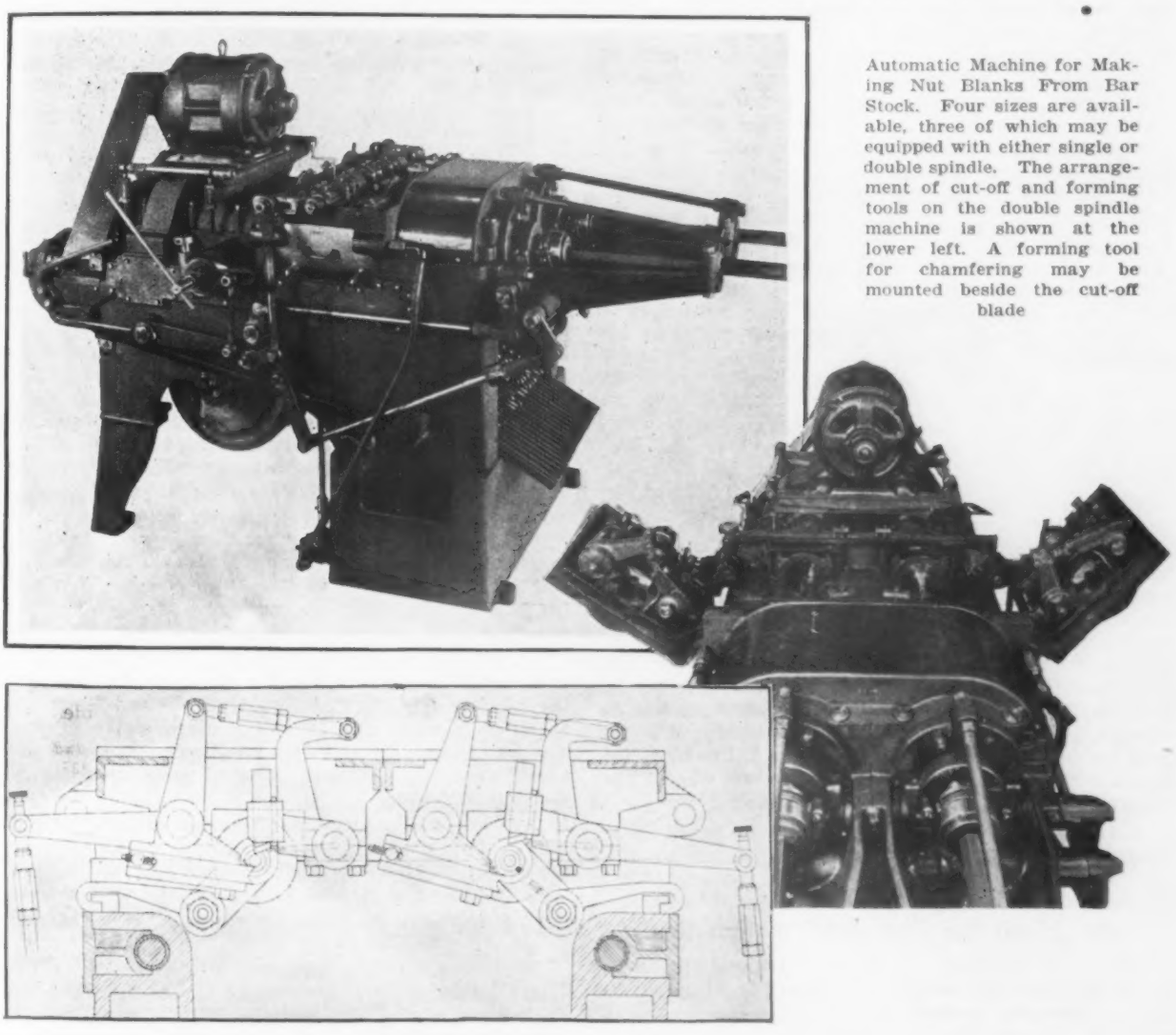
*Barrels of lime.

The Detroit Testing Laboratory has under construction a 3-story laboratory building to be occupied entirely as a consulting, engineering, and testing laboratory, at 554 Bagley Avenue, Detroit. The new quarters will be ready for occupancy by April first.

NEW AUTOMATIC BAR MACHINE

High Production Claimed in Making Nut Blanks from Hexagon Bars

A new automatic bar machine intended primarily for high production on the simpler screw machine parts, particularly those requiring longitudinal drilling, such as nut blanks, bushings, chain rollers and pipe couplings, has been brought out by the Budd-Ranney Engineering Co., Columbus, Ohio. The machine is arranged to cut-off, form turn, drill, counterbore and box turn pieces that can be finished in a single cut, and in making nut blanks from hexagon bars unusually high production is claimed.



Automatic Machine for Making Nut Blanks From Bar Stock. Four sizes are available, three of which may be equipped with either single or double spindle. The arrangement of cut-off and forming tools on the double spindle machine is shown at the lower left. A forming tool for chamfering may be mounted beside the cut-off blade

Four sizes are available, ranging in maximum capacity from 1 in. rounds or ⅞ in. hexagon, producing pieces up to 1 in. long, to 4 in. rounds or 3⅛ in. hexagon, producing pieces up to 2¼ in. long. The first three sizes are available in single or double spindle, horizontal type. The largest size is built in single spindle horizontal type only.

The machine is motor driven through silent chain transmission to the clutch shaft, from which the drive to the drill spindle is also by silent chain. The stock spindle is driven by gears from the clutch shaft. Coolant is circulated by an independent motor driven centrifugal pump which in the three smaller machines provides coolant at 10 lb. pressure, and at 20 lb. pressure in the larger or No. 4 machine. The independent pump drive provides constant pressure of the coolant regardless of the speed of the machine. A variable-speed motor-driven fan provided to cool the cutting chamber is intended to eliminate generation of steam in the chamber because of high temperature, and permit continuous operation of the machine. A water and vapor proof electric lamp is mounted in the cutting chamber so that the tool operation may be observed through the film and splash without shutting off the cooling solution.

The work and drill spindles, motors and other parts revolving at high speed, are mounted on ball bearings, and all cam rollers are equipped with roller bearings. Stock guides run in ball bearings and the stock is carried on rollers which reduce feeding friction and permit handling of bars of any length desired. The smallest machine weighs 4500 lb. and the largest 7500 lb. The floor space occupied by the smallest unit is 4½ x 6½ ft. and by the largest machine 4½ x 10 ft.

On commercial screw stock 140 ft. cutting speed for tools, and from 120 ft. on small drills up to 140 ft. for drills ⅝ in. and larger, are recommended. For the particular type of tooling employed feeds of 0.008 to 0.012 in. are said to be more desirable from a tool maintenance standpoint than lighter feeds. It is claimed that because of the shaving action of the finishing tools the amount of feed has no influence on the finish of the product.

At the speeds and feeds recommended, the tools are said to function for about 55,000 ft. lineal cut before needing grinding. In making nut blanks on the double spindle machines with two sets of tools, for instance, the tools should produce from 36,000 ¼-in. blanks at 2400 per hr. to 3800 1¼-in. blanks at 450 per hr. On the single set of tools the production would be half of these amounts. The elapsed time between tool grindings would be about 12 hr. in the smaller machines to about 8 hr. on the 1¼-in. size. The makers claim to have had an exceptional set of tools which operated for 27 hr. on the 1¼-in. size, with 0.0088 in. feed, making lineal cuts aggregating approximately 165,000 ft. On the single spindle machine, for the larger sizes, it is said that the tools may be expected to produce 1200

1½-in. nut blanks at 150 per hr. and 750 2-in. at 90 per hr. For reducing the stock lost in chips a different type of tool is used on the single-spindle machines, and a comparison with the output of the smaller machines is therefore misleading.

The efficiency of the machine cycle is a feature also emphasized. Cams are designed so that the tools are cutting through 310 deg. or 86 per cent of the cycle, the remaining 50 deg. or 14 per cent of the cycle being consumed in tool return, chuck opening, feeding and chuck closing.

Centrifugal Chuck a Feature

To provide a chuck which would be influenced the least by variation in size of stock the centrifugal principle is employed for securing the gripping power, with cams for releasing. As drilling and cutting-off are performed simultaneously, the chucking must be firm, which is accomplished by having sufficient mass in the revolving weights and having a releasing mechanism of ample strength. A feature of the chuck is that regardless of the position of the cam, its grip is released when the machine is not in operation.

Spline drive between the chuck collet and the stock feed tube is a feature. This is intended to hold the stock central with the chuck opening when the chuck is released, preventing friction at this joint from interfering with the accuracy of the feed. It should be noted that in this design a feed stop is not used, the length of feed being governed solely by the feed stroke, an arrangement claimed to have been found to be a more accurate feed for bars of varying lengths, up to 30 ft. Another feature is the use of an inner tube which expands the feed fingers when the withdrawing or entering the stock or neutralizing the feed is desirable, as when setting up the tooling for a different product. Springs in pockets in the retaining nut are intended to prevent the floating of the spindle during the cutting cycle regardless of bearing adjustment. This is said to provide adjustment free enough to eliminate detrimental effect on bearings of expansion or contraction due to temperature conditions.

The cams on these machines are of the disk type. The one employed for opening the chuck is of plain open style, and the other, for the cutting movements is profiled so that springs or weights are unnecessary to effect return movement. These cams are of a 0.55 per cent carbon steel, heat treated, and are bolted to a cast iron hub which also carries a driving worm wheel. The cams are located under the drill spindle end.

The tool arrangement for cut-off and forming tools on the double-spindle machine is shown in an accompanying illustration. In both the double and single spindle machines the tools are mounted on platens which pivot to convenient positions for tool inspection and replacement. The independent supply of cutting compound to each tool is a feature, the compound entering from behind the blades, its force aiding the escape of the chips from the cutting edges and preventing obstruction of coolant by the chips.

In the double-spindle machine two tools are used to accomplish the cut-off, one being a 120 deg. diamond point tool, cutting on one end, without side clearance and with four cutting corners. This is supplemented by a tool of more regular form, a few thousandths wider, following closely and taking a shaving cut, furnishing clearance for the diamond point. The latter is sharpened by grinding on end only, which is emphasized as in favor of low tool cost.

After these tools perform their work the stock is fed forward, the drill and counterbore coming into operation while the cut-off tools are cutting another piece. It should be noted that the piece is drilled off and not cut-off, an arrangement intended to keep the tools farther apart, the heat of one not influencing the other. It is also claimed to permit of a higher machine cycle, as either tool may overlap the cycle of the other. A forming tool for chamfering or castellating may be mounted beside the cut-off blade.

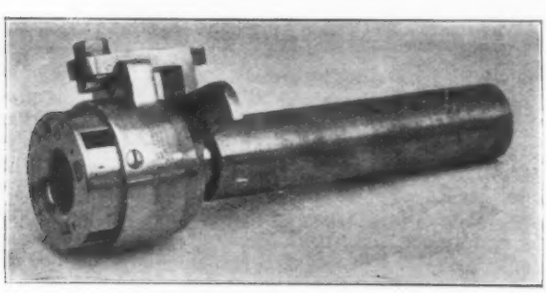
In this design the position of the tools is positively located so that in setting, no measurements have to be taken, arm positions and strokes being graduated so that the operator may place the correct tools in position and set adjustments accurately according to tables. Further adjustments, for extreme accuracy may be made while the machine is operating.

On the larger size nuts, material wasted in cut-off chips is a relatively important item, especially if the width of the cut is kept in proportion to the depth of cut. As there seems to be a limit to the amount of feed for a given width of tool, two diamond point and one finishing tools are employed on the larger machines.

In the Nos. 1, 2 and 3 machines the spindles can be operated independently. In the Nos. 1 and 2 machines the spindles can run at different speeds and feeds, and on different work. On the No. 3 machine the spindles may be run on different sizes and types of product and at different feeds, but at different speeds only when specially arranged.

Die Head for Cleveland Automatics

A line of die heads for use on Cleveland automatic screw machines and similar equipment, and incorporating an improved method of adjustment for the length of thread cut, has been placed on the market by the Eastern Machine Screw Corporation, New Haven.



Method of Adjustment for Length of Thread a Feature

Two styles, designated as the CC and the D H&G die heads, respectively, are offered. The former is available in six sizes, from 9/16 to 3 in. and the style D, which is illustrated and is for use on Cleveland automatics, in the smaller sizes, ¼, 7/16 and 9/16 in. The CC head is provided with longer guide pins than the style C head, used on hand turret machines, and the locking pin, with its threaded shank, is provided with an adjusting nut and lock nut.

When the forward movement of the turret or tool holder ceases, the die continues to thread until the forward movement of the locking pin is stopped by the adjusting nut coming in contact with the flange on the shank, and the die head immediately opens. A finer adjustment in length of thread is therefore said to be provided than obtained by moving the die head farther out or farther into the turret or tool holder. This adjustable tripping mechanism is of simpler and stronger construction than that used formerly.

The heads are closed automatically by means of a closing stud or lug which comes in contact with an overhanging arm on the machine as the turret rotates.

On the style D head, which is often provided with a longer shank, the fine adjustment for length of thread is self-contained on the arm from the shank that overhangs the head.

The United States Steel Corporation will donate $300,000 toward the construction of a Y. M. C. A. building for the Calumet region, to be located at South Chicago, if a similar amount be contributed by others, according to an announcement of E. J. Buffington, president Illinois Steel Co., at a dinner given to promote such a project. One of the other speakers stated that $58,000 had already been raised from general contributions and that a systematic canvass would be made to obtain the remainder.

Progress in Scientific Management

Developments During Past Decade Reviewed at Taylor Society Meeting—Future Obligations Outlined—Personnel Management Discussed

A PROGRAM having as its underlying purpose the putting on record the high lights of the development and application of scientific management during the past decade was presented at the meeting of the Taylor Society held in New York, Jan. 24, 25 and 26. The functional aspects emphasized were those of the general manager, the sales department and the personnel department.

There were six sessions at which seven papers were read and 19 prepared discussions presented. Many suggestions for extended activities of the society were offered, and the suggestion that the society recognize psychology more emphatically as a factor in management and included the subject on the programs of future meetings met with approval.

There were more than 275 members and guests registered. Richard A. Feiss, Joseph & Feiss Co., Cleveland, and Edward W. Clark, 3rd, Philadelphia, continue president and treasurer, respectively, of the society. Percy S. Brown, Corona Typewriter Co., Cortland, N. Y., was elected vice-president and Mary Van Kleek, Russell Sage Foundation, New York, and William B. Ricketts, Operadio Corporation, Chicago, were elected as members of the board of directors in place of Ida M. Tarbell and W. Herbert Ballou.

Present and Future Management Discussed

The accomplishments, shortcomings and future obligations of scientific management were outlined comprehensively in a paper under the title of "A Critical Analysis of Scientific Management," by Henry H. Farquhar, Harvard School of Business Administration.

That to have scientific management all that is needed is to introduce some sort of an incentive payment scheme was brought out as one of the fallacious ideas about scientific management, and in this connection Mr. Farquhar said that the particular pay system adopted is of minor consequence and emphasized as of paramount importance standardization as a basis of wage incentive payment. "The essence of scientific management," he said, "consists in the application of certain broad principles; the particular way that these principles are applied is a matter of subordinate detail."

Significant viewpoints which, as a result of Frederick Taylor's vision and in light of best development of Taylor's principles today, distinguish the scientific management movement were summarized by Mr. Farquhar. One of the viewpoints emphasized was that business is organic, that no part can function to best advantage until all parts function well. Another was that standardization and scientific methods throughout the business are necessary for organic control and that management must be based on facts. That interests of employer and employee are mutual, and that the management must take the lead in bringing about proper conditions were also viewpoints cited. Another was that lasting development must come from within the organization, that scientific management cannot be installed from without.

The positive contributions of scientific management were discussed in detail. The spirit of cooperation and confidence, and the feeling of security on the part of the whole personnel were given as the most important of the positive products of advanced management. "Without them," he said, "although a certain efficiency may be obtained, true scientific management is impossible." Significant advances of the last few years including cost methods, functional organization, fatigue, executive reports and refinements of control were also outlined. The influence of Taylor's philosophy on industry was said to have been tremendous, and although the growth of really scientifically managed plants had been slow, it had been healthy and permanent.

In the section of the paper dealing with neglected opportunities Mr. Farquhar raised the question as to whether sufficient weight had been given to the matter of personality in management. The speaker also questioned whether it had been sufficiently realized that in order to live up to Taylor's ideals the need of real leadership is even more necessary than under the older types of management. Considering the question of fatigue from a too coolly scientific standpoint was questioned. Neglect of scientific management's opportunities and obligations to organized labor, the showing of more readiness to meet it half way in a constructive program was also mentioned, Mr. Farquhar indicating that there are great possibilities for cooperation.

Lack of adequate analysis, the neglect to analyze sufficiently the particular sales, production and financial problems of the particular business before attempting to apply methods for more effective management was cited as one of the most serious criticisms to be leveled against followers of Dr. Taylor.

The failure to get the message of the followers of scientific management accepted was taken up and the attention given to the mechanisms and methods of scientific management at the expense of basic principles was discussed. Because the easy way is usually more attractive to the average manager, short cuts being particularly tempting, was indicated as perhaps one reason why the message has not been more fully absorbed. In this connection he said that he believed it was primarily a case of psychology. "We have too often given the impression to the manager that nothing which he has or does is worth much, that we have asked him as well as his workmen to 'lose face' by insisting that he back up on matters which he cannot do without losing status, as well as by failing to give credit for good work and good suggestions where credit is due."

Securing of Suitable Foremen a Problem

Of obligations and future problems, the securing of suitable foremen was emphasized as one of the biggest problems ahead. This, it was indicated, was not only necessary for securing the maximum production at least cost, but also that the increasing realization of the importance of foremen from the industrial relations standpoint is constantly emphasizing the necessity of training high grade men for these key positions.

The better utilization of unskilled labor because of restricted immigration, and also the devising of labor saving equipment and methods to make up for an inadequate supply of common labor was expressed as deserving of intensive study.

The question of fatigue, Mr. Farquhar said, must be given additional attention for the proper determination of rest and delay allowances. The devising of more expeditious means of production control, the reducing of high selling expense, questions of seasonal industry, continuity of employment, unemployment insurance, service bonus and pension systems and the coralling of the business cycle were other activities the author thought should be given attention. Fostering of relations with organized labor was emphasized, and a prime duty ahead said to be to foster increasing readiness on the part of the banker to look beyond the balance sheet. One of the big questions to be faced in the future was said to be that of getting back more nearly, not to the one-man organization itself, but to the essence of it so far as coordination, control and personal touch go.

The elimination of waste in material and labor was emphasized by Robert T. Kent, consulting engineer, Montclair, N. J., in his discussion of the paper, as being a problem ahead, and the application of scientific

management, it was stated, would do more to eliminate waste than all other mechanisms. That the future of scientific management lay in management for the public interest was also brought out by Mr. Kent, who developed the view expressed in his article on the subject in THE IRON AGE of Jan. 17. Philip F. Moen, New England Butt Co., Providence, where F. W. Taylor installed his system 12 years ago, and Frank B. Gilbreth, consulting engineer, Montclair, N. J., also discussed Mr. Farquhar's paper. Dr. Joseph W. Roe, past president Society of Industrial Engineers, presided at the session.

Personnel Work Under Scientific Management

Why a scientific management plant offers the proper environment for the highest type of personnel work, was set forth in a paper on "Personnel Work in Scientific Management," by Mary Gilson, superintendent of employment and service, Joseph & Feiss Co., Cleveland.

In this paper, as in others presented at the meeting, F. W. Taylor's warning not to confuse the essence and philosophy of management with its methods was emphasized. His underlying philosophy was reviewed to determine how far it affects the happiness and prosperity of the worker.

"Workers in plants," said Miss Gilson, "as well as citizens in cities, want constructive leadership in the development of a true science of management that will reduce chaos to order. Workers like order and system." In discussing standard practice, it was brought out that while times change and men's ideas change, nothing can cause such widespread discontent as a variety of policies in the same organization at the same time. There are too many conclaves being repeated, she said, over matters which should be codified and put in black and white.

Employee representation as a factor in organizing for good will was discussed, and in this connection it was said that the success or failure of group representation depends upon "the earnestness of people in this great game of understanding each other, and that it can be gained only by years of close contact and fair dealing." Its value was said to lie in the publicity acquired by group discussion, the good will acquired by group agreement and the sportsmanship which an organization governed by integrity can inspire in its members, not only in the discovering of laws but in abiding by them.

The scientific selection of workmen was also discussed, and it was stated that although the selection of workmen cannot be wholly scientific, it can, at least, approximate the scientific. By careful physical examinations, by mental tests, by constantly improving methods of selection through analysis and synthesis of experience, one can at least arrive, it was said, at a fairly satisfactory process of selection.

An employment department with a "system" which is put into practice by someone who is applying conscientious thought and energy to the job was cited as a factor in stabilizing the confidence of workers. The need for organizing employment work into a distinct department was emphasized.

Building Up a Strong Organization

The fitness of an applicant for the organization was said to be considered in many plants operating under scientific management the most essential qualification. "There are certain prime qualities, such as a fair degree of intelligence, perseverance, a cooperative spirit," said Miss Gilson, "which must be present for the building up of a strong, enduring organization. Many organizations are in constant state of turmoil because so-called scientific methods of hair-splitting variety are employed without considering the great essential—fitness for the organization."

Training of the worker as a fundamental of good management and as a policy which is foundational to effective personnel work was given attention. Two types of training were said to be due a worker, one kind relating to the technique of his job and the other to the development of his character as worker and citizen. It was stated that labor turnover is highest during the early months of employment, and as methods of teaching new workers improve, it is possible greatly to reduce labor turnover. A fair and workable system of promotion was emphasized as impossible without "scientific" education and development of the worker. A clearly defined and above-board method of training and advancing workers was given as a most important factor in assuring a sound sense of justice in them. Where the scientific management point of view prevails, she said, workers see evidences on all sides of policy and system taking the place of favoritism in the matter of promotions.

The training of foremen by a series of lectures and discussions conducted by some foremen's training agency was said to be good, but does not go far enough. In this connection Miss Gilson said: "Nothing can relieve management of its duty in training of its own foreman. When a manager gets to the point where he expects his foreman to clarify and explain organization policies to workers without realizing his own responsibility in the enunciation of these policies, he is taking too much for granted."

The function of the personnel department as the "maintenance of personnel" was characterized as just as vital to the existence of an organization as is the maintenance of machinery. It involves, it was explained, the keeping of all positions filled with the best fitted and most cooperative personnel obtainable.

In discussing the paper Robert B. Wolf, New York, stated that workers want a management that knows what it is doing. The printed book of rules given to a new worker should be eliminated, he said, verbal instruction being better. This was a view also expressed by others. Mr. Wolf said that to him industrial relations means "industrious" relations. He emphasized the danger of too much functionalization and stated that direction in detail is frequently overemphasized.

A session was addressed by H. P. Kendall, Boston, on the subject of "Types of Managements: Unsystematized, Systematized and Scientific." Mr. Kendall presented a paper under the same title at the Tuck School Conference of 1911, and his address included observations of developments since that time. His observations made in the 1911 paper regarding shop operations held good today, he said, and he confined his discussions to other departments of the business, including administrative control, sales, and others.

A paper on "Scientific Management and General Administrative Control," by John H. Williams, consulting engineer, New York, had for its object the reviewing of the influence of scientific management principles on the practice of general management, the coordination of the major functions of selling, finance and production.

Administration was characterized as that function which coordinates managers or management, the coordination being conscious and a matter of record. Scientific management was credited with having made a great contribution to administration, and the modern administrator said to have a big advantage over his predecessors. The first and most important contribution of scientific management to administration was its formulation as a science and a branch of engineering, thus enabling it to be included among the sciences available to administrators.

Psychology a Factor in Management

Mr. Williams discussed briefly the extent to which F. W. Taylor's five principles are found in administrative control. He discussed more fully, however, the recognition of psychology as a factor in management and administration. "Mechanical engineering," he said, "has reached its high state of development largely through the information available concerning the material with which it deals, furnished by physics and other sciences. Management engineering has attempted to go forward on the information accumulated by the mechanical engineer, seemingly overlooking the fact that its principal material was man himself."

The recognition of psychology by executives as a

(*Concluded on page* 401)

Steel Fabricators Plan for the Future

Activities Under Way Toward Securing Technical and Commercial Advancement Discussed at Meeting of American Institute of Steel Construction

AMERICAN Institute of Steel Construction, now grown to an organization embracing 110 steel fabricating companies, and looking forward at an early date to an increase to 200 member units, did more than merely hold its annual convention at Pittsburgh on Jan. 22 and 23; it laid a substantial foundation in the shape of the adoption of a forward-looking program covering a period of four years. In furtherance of this the members pledged themselves to allow the directors to double the present assessment of 5c. per ton on structural sales and approved an appropriation of $50,000 for the work of the first year.

An interesting and encouraging report on the progress of the work of the committee on standard specifications was a feature of the convention and the report of the committee on standard practice found approval, with a minimum of adverse criticism and this chiefly on the matter of weights and the method of charging for them. "Cooperation" and "coordination" were frequently stressed words in the addresses of invited speakers and the keynote of the convention as a whole was that the welfare of the industry as a unit was paramount to the success of any individual member.

The luncheons were featured by excellent addresses on the benefits of cooperative effort, on Jan. 23, by George H. Charls, vice-president and general manager United Alloy Steel Corporation, Canton, Ohio, and on Jan. 24 by James A. Emery, general counsel National Association of Manufacturers and the National Industrial Council, Washington. Of gripping interest was the talk of John W. Doty, president Foundation Co., New York, following the banquet on the evening of Jan. 23. Mr. Doty's subject was "The Story of the Japanese Earthquake and Its Influence on a Program for Better Buildings." He recounted his personal experiences, since he was aboard ship at Yokohama at the time of the earthquake, and saw at first hand the devastation there and at Tokio.

The convention had a registration of 150, or about double that of the previous annual meeting held at Pittsburgh in November, 1922. The fact that the program was completed in exactly 15 min. after the scheduled time for concluding the convention attests how well it was handled by J. L. Kimbrough, Indiana Bridge Co., Muncie, Ind., president of the institute, and Charles F. Abbott, New York, executive director.

Directors Elected

H. B. Hirsh, Belmont Iron Works, Philadelphia; L. L. Gadd, Levering & Garrigues Co., New York; E. W. Kreuger, Worden-Allen Co., Milwaukee, and C. W. Fitts, New England Structural Co., Boston, whose terms as directors expired this year, were reelected for three years, and E. S. Mattice, Canadian Vickers, Ltd., Montreal, was elected a director for three years.

It was voted to hold the next annual convention next November at French Lick Springs, Ind.

Need of Structural Steel Standards Being Understood and Practiced

THE report of the specification committee, composed of George F. Swain, professor of civil engineering, Harvard University; Milo S. Ketchum, dean of the College of Engineering, University of Illinois; E. R. Graham, of Graham, Anderson, Probst & White, architects, Chicago; W. J. Thomas, chief engineer, George B. Post & Sons, architects, New York, and Wilbur J. Watson, president Watson Engineering Co., Cleveland, submitted by L. H. Miller, chief engineer of the institute; at the morning session of the first day of the convention, after reviewing the activities of the committee and outlining how the present 16,000-lb. unit stress for buildings came into existence, says in part:

"The wide range of practice now existing based upon a 16,000-lb. unit stress makes it evident that uniform practice can never be accomplished by the mere definition of a basic unit stress. I have prepared a blue print showing some of the innumerable column formulæ now existing which have resulted from the fact that the steel industry has never taken upon itself the problem of establishing uniform practice. In considering these data our specification committee realized that if their work was to accomplish its intended purpose it must include also a clear definition of the numerous conditions connected with the use of such a unit stress as they were recommending, and for this reason they decided that a detailed specification was necessary, otherwise there would be as wide a range of practice grow up about a new unit stress as now exists in the old one.

"While it is true that all of the mill catalogs at the present time adhere to the 16,000-lb. unit stress in giving the safe loads on various beams uniformly loaded, there are no two of these books which handle the question of columns, webs, compression flanges or rivet shear the same. If it were possible to acquire and destroy all of the mill handbooks now in existence, it would still be doubtful whether a uniform practice could be established on a 16,000-lb. unit stress basis. Undoubtedly, the most effective way of eliminating the influence of existing handbooks is the adoption of a unit stress which will make the present data surrounding them obsolete and replace it with a specification that will cover the subject in such a way as to eliminate the development of future variation.

"It is no doubt reasonable to believe that a large part of the trouble which we experience in our industry is the result of the fact that even though we have operated on a 16,000-lb. unit stress basis, we have left open opportunities for such a wide range of practice that the irresponsible engineer, architect or fabricator is in a position constantly to compel the lowering of the standards of responsible firms. While many of us may think that our troubles are largely due to external competition, we should not overlook the fact that inside of our own industry there are practices which are possibly more serious to fair competition than any external competition can be.

"The result is that the purchaser of structural steel in a locality not regulated by a comprehensive building code has no firm assurance that the prices he receives are based upon the various firms giving him the same product. Responsible firms are forced into the position of meeting prices made by irresponsible bidders, and they must sacrifice in many cases part of their actual costs to meet such competition. The result is a tendency to constantly lower the standards of the industry rather than to elevate the standards of the irresponsible bidder.

"The United States Department of Commerce has recognized this feature as a very serious menace to practically every industry in the country, and is urging these industries to associate themselves in a program to promote uniform practice. We have had splendid cooperation from various divisions of the Department of Commerce at Washington in the work we are doing,

because it has been recognized as one of the most constructive moves ever undertaken in the steel industry.

Consideration of Live Loads

"I believe it would be proper at this time to point out some of the questions connected with the specification itself.

"In the first place our committee considered that under present conditions it would be impossible for them to include a clear definition of the numerous live loads that should be applicable to various types of building constructions, and they therefore confined the specification strictly to the uses of steel itself, leaving the question of live loads for future development. You will be interested in knowing that the Department of Commerce at Washington is now following up this question of a uniform definition of live loads in various structures. The committee also considered that it would be proper to adopt the definition of structural steel for buildings as laid down by the specifications of the American Society for Testing Materials as an appendix to our own.

"In the consideration of impact there is such a wide variation in the action of live loads that the engineer was considered the proper person to handle such a subject, but our committee considered that it was necessary to require this point to be included. They have therefore stated that all impact stresses shall be reduced to an equivalent static stress and treated as such. In other words, it is considered improper to modify a unit stress in any material to take care of the ignorance of the engineer on the subject of live loads. If there is a variation in the live load, it is considered proper that this variation should be taken care of in the definition of the load itself rather than in an attempt to conceal it by changing a unit stress.

"In the consideration of wind stresses, our committee found a very wide range of practice. The maximum pressure that has been found in experiments on small surfaces by the Navy Department on the Pacific Coast is only a little over 16 lb. per sq. ft. So far as I know, there is not a building code now in existence which requires specifically that a steel frame shall carry the entire load due to wind, but the regulation is so worded that the structure itself must carry certain wind pressures. The result has been that, in many localities, engineers consider that the inertia of the structure is so great that wind has little influence in producing deflection in the building, and it is an obvious fact that except for impact, every stress is accompanied by a corresponding deflection. If deflections do not exist, the engineer argues that due to inertia stresses do not exist.

Rational Basis for Column Formulas

"In consideration of our column formula, very extensive discussion resulted, and I believe that we have successfully taken this subject out of the empirical consideration and put it on a clear rational basis. Experiments over the past 50 years have shown that material in compression will fail either by bearing, by shear, or by flexure. It is known that until the ratio of L/R is 15 or more, steel in compression will fail by bearing; that is, the flow of the material itself. From 15 L/R to somewhere approximately 80 L/R it is known that the specimen will fail by shear immediately followed by buckling, but this buckling consists of the specimen folding up about the point where initial failure by shear originated. Beyond approximately 80 L/R the specimen fails by flexure from end to end, and obviously therefore, the formula for this type of failure must include some factor that takes care of this bending condition.

"From a consideration of this it becomes obvious that no single line can be drawn representing three conditions of failure. It is also reasonable that inasmuch as the question of shear is the controlling factor for specimens up to approximately 80 L/R, this part of the strength of columns should be represented by a horizontal line indicating a uniform allowable stress based upon the shearing value of the material. The plane upon which this shear develops is indicated by the fact that the shortest length upon which shear will be the basis of failure is approximately 15 L/R, although it has been found that in some cases the material will fail by bearing as high as 25 L/R.

"The shearing value of steel has been found in the past to be a little over two-thirds of the ultimate strength in tension or compression; and our committee decided that the proper shear per sq. in. on structural shapes was 12,000 lb. It will be found that when L/R is 15, the plane upon which shear develops is approximately 35 deg. to the axis of the column, and if on this plane 12,000 lb. is the proper working stress, the axial load on the column will be 15,000 lb. per sq. in. That is an axial load of 15,000 lb. per sq. in. will develop a shear of 12,000 lb. per sq. in. on the plane on which shear usually acts. For this reason the committee considered that 15,000 lb. was the proper working stress up to the point of approximately 80 L/R, but inasmuch as this point is not very clearly defined, they drew it back to 60 L/R.

"I have prepared a development of the Rankine formula which our committee has recommended, which clearly shows that it properly considers the conditions of bending beyond the point where shear ceases to be the dominating strength of the material. This development is so simple and rational that our column formula becomes obviously correct, and we have been able to determine rationally the proper constant to use in the dominator of the Rankine formula, thereby eliminating the consideration of this important question from the field of empirical consideration."

The reports also dealt with the compression flange of beams and girders, and the foregoing will give an idea of the scope of treatment given to structural design factors. It took up the stresses in the webs of beams and girders, in the past one of the subjects handled almost entirely by empirical formulæ. One of the charts of the report covering web shear and stiffeners gives directly the allowable shear in the web of a girder when the thickness and distance between flanges is known; also if the shear per sq. in. is known and the thickness of the web given it will read directly without calculations the proper spacing of stiffeners. Another chart also without calculations gives the percentage which a laterally unsupported compression flange will carry of the same flange laterally supported.

Painting of Structural Steel

The proper working stresses for the shear and bearing value of rivets and bolts was discussed in the report and the question of painting. "It has been found that where material is encased in concrete," the report went on, "it is better if the steel is not painted. One of the items of cost which constantly interferes with rapid shop production is the old practice of painting surfaces in contact before assembling. This cost is not the result of the amount of paint required, but the delay in the work of the assembling crew, which usually is compelled to stand idle while the surfaces are being painted. Different fabricators have examined this condition, and some of them have estimated that this item of labor wasted by the assembling crew is more expensive than the complete painting of the job after the work is assembled and riveted. One of them has stated that he believes the elimination of this item will run $1 per ton, and perhaps as high as $1.50 per ton. This of course is a question that cannot be accurately determined, but there can be no doubt but what a great increase in speed can be accomplished when this obsolete practice is eliminated.

"Experiments have been made on specimens that have been painted, one, two and three coats, and then riveted together. The rivets have been sawed through the axis, and it is found that at the point where the hot rivet comes in contact with the painting the paint is completely destroyed, setting up a condition which might be more serious than as if no paint had been used at all.

Rivet Cost $60,000,000 a Year

"It is a well established fact that one of the principal items of cost in the fabrication of structural steel consists in the locating, punching, assembling, heating, and driving of rivets, and under past conditions there

has been an enormous amount of waste in this item. Between 3 and 4 per cent of the average weight of structural steel is now considered rivets, and these rivets cost somewhere in the neighborhood of 15c. to 20c. apiece. If the industry is doing 3,000,000 tons of structural steel annually, there would be approximately 100,000 tons of rivets at 3 1/3 per cent. If these rivets averaged one-half pound each, there would be 400,000,000 rivets; and if they cost 15c. apiece, they represent a total of $60,000,000 a year.

"Obviously our specification cannot save the entire difference as represented in the unit stresses, since many rivets are required in the assembling of columns, and girders, which are not based upon the shearing value of the rivet; but it is not unreasonable to suppose that there should be a saving in the neighborhood of $10,000,000 a year if our specification were applied to all of the industry. On the same basis of our specification applied to the entire industry, there should be a saving in material of close to $30,000,000 a year based upon an erected cost of $100 per ton. This specification therefore represents one of the most constructive steps that has been taken in the reduction of building costs which is now one of the subjects discussed in almost every paper and magazine in the country.

"The specification was printed and circulation started in July and already there are nine cities in which its use is directly or indirectly permitted. Four of these cities have a population of nearly one million."

Mr. Miller expressed it as his conviction that as soon as the institute can produce and publish a handbook showing the allowable loads on structural shapes and including an approved code of practice, the institute will be almost immediately recognized as the authority on this subject. "The present mill handbooks," he said, "are primarily made to answer the requirements of the various departments of the manufacturers of steel, and after all of these conditions have been satisfied, the book is made to include data for use by the engineer and architect. The result is that under present conditions it is necessary for the engineer to refer to many pages before obtaining the complete data which is scattered in various places. The result is that many important subjects never receive consideration. One of the mill engineers has stated that we are in an excellent position to produce a compact and comprehensive book which would be so much easier for the engineer and architect to use, that the mill handbook would become unnecessary. There is of course a large amount of technical calculation to be made in the preparation of this work, but we hope to have the assistance of the various mills in this undertaking."

Four-Year Program of the Institute

CHARLES F. ABBOTT, executive director of the institute, at the afternoon session on Jan. 23, in presenting an outline of the program of the institute stated that there was no intention to fight competitive materials, but rather through a broad campaign of education, publicity, cooperation with technical schools and colleges and through exhibitions, there was to be an intensive effort to further the use of structural steel. He said that the program had been inspired by the growing need of organized activity among steel fabricators for the purpose of preserving the interests of steel and of maintaining its rightful place among structural materials.

"The basic idea upon which the program was formulated," said he," is the idea of constructive cooperation. The theory of the new industrial relationship is that no one individual company can profit in the long run except as other individuals in that industry prosper. We can no longer ignore the fact that since 1912 the use of structural steel has actually fallen off and during the same period the use of some other building materials has increased almost 500 per cent. This condition cannot be attributed exclusively to any superiority of greater adaptability of these materials; on the contrary, it is due in great measure to such cooperative accomplishments as standardization, simplification and increased efficiency within these other industries and to their concerted, aggressive and sustained activities in educating architects, engineers, builders and the public at large to the advantages to be gained by the use of their products."

A resolution offered by H. B. Hirsh, Belmont Iron Works, that the program be adopted and an appropriation of $50,000 be granted for carrying out the first year of the program; that the present assessment of 5c. per ton on structural sales be continued, but that if through increased membership or other support of a financial nature a larger sum becomes available, or when the directors become sufficiently encouraged, they obtain by letter ballot a vote of the entire membership approving an increase in the assessment for the purpose of speeding up the program. There was much discussion of this resolution in which it was brought out that the present assessment on the present membership tonnages yielded only $37,000. It was the contention of several speakers that if the program was to be carried forward, the effort should not be stifled by a lack of funds and the appropriation of $50,000 was considered too small even to give it a good start. Mr. Hirsh's resolution, amended by Mr. Kellogg, Kellogg Structural Steel Co., Buffalo, was adopted providing that the directors be empowered to increase the assessment to 10c. per ton.

Report of the committee on standard practice was presented by W. M. Wood, president Mississippi Valley Structural Steel Co., Decatur, Ill., in the forenoon session of Jan. 24. A motion that the report be approved and put into effect for the industry and at a time and in such shape as the directors may choose was carried, with the proviso, however, that the membership should have ample time for the reading of the recommendations and were to be heard from before action by the directors. Discussion of the report was confined chiefly to section 4, covering methods of invoicing. The paragraph of this section covering weights was discussed with particular freedom. This paragraph reads:

"Structural steel sold at a unit price per pound, hundred-weight or ton, shall be invoiced on estimated theoretical weights, based on the detail drawings and shop bills and on the following basis:

"1.—The weights of shapes and plates, castings, rivets and bolts shall be calculated from finished shop drawings. The unit weight of shapes and plates shall be taken from the handbook of the mill furnishing the steel, and no deduction shall be made for cuts, punchings, millings or shearings.

"2.—The weights of each coat of paint shall be taken as (8) eight pounds per ton of material painted."

One speaker thought that steel should be sold by fabricators as bought from the mills and the provision which gave the buyer no allowance for cuts, punchings, millings and shearings was likely to be resented by buyers.

Cooperative Efforts Stressed

George H. Charls, vice-president and general manager United Alloy Steel Corporation, who addressed the members at the luncheon on Jan. 23, made a vigorous plea to the steel fabricating industry to wake up and observe and profit by the cooperative efforts of other industries. He drew attention to the success of cooperative effort among the farmers; to that in alloy steels for the automobile industry and for reciprocating parts of locomotives. He pointed out that in connection with automobiles that the advances made possible better automobiles at lower prices than before the war and that the automobile was one product that had grown cheaper instead of more expensive in recent years.

James A. Emery, general counsel National Association of Manufacturers, the speaker at the luncheon on Jan. 24, also stressed the advantages of cooperative trade associations, emphasizing that the American business man, being essentially an individualist, would have to learn that an army composed of colonels or centurions never would achieve much and that the greatest good to any industry came through submerging the

individual good for the benefit of the whole industry.

J. D. Ellsworth, advertising director American Telephone & Telegraph Co., New York, spoke on "The Benefits That Can Be Derived Through Educational Publicity" at the afternoon session on Jan. 23. Speakers at the banquet on the evening of Jan. 23 were Russell R. Whitman, president *New York Commercial*, who spoke on "Good Citizenship," and John W. Doty, president Foundation Co., New York, whose subject was "The Story of the Japanese Earthquake and Its Influence on a Program of Better Buildings." Mr. Doty's talk was largely devoted to his experience in Japan at the time of the earthquake, but touching upon the subject of the effect of the disturbance on steel structures said that buildings with facings of brick or tile fell apart but that those buildings in which the steel was embedded in concrete had withstood the shock without noticeable effect. He urged that the buildings for Japan should be designed for unit rather than member strength and the tying up of the members with concrete. He said Japan is an excellent field for steel structures; that builders need have no fear of their investments in that country, since the Japanese are a thoroughly practical people, and that the Government is helping toward more substantial construction.

"Selling as Applied to Contract Work" was the subject at the morning session, Jan. 24, of John G. Johes, vice-president Alexander Hamilton Institute, New York, and at the same session H. J. Kenner, president Better Business Bureau of New York, spoke on "Trade Customs and Business Ethics." At the afternoon session, that day, there were brief talks by Walter Drew, counsel National Erectors' Association, New York, who gave some of his experiences in the open shop movement; by E. W. Ruelbach, the former baseball player, now commissioner of the New York Piano Manufacturers' Association, who told of some economies and benefits in traffic problems through cooperation among New York piano manufacturers, and by R. B. Thomas, secretary Iron League, New York, who explained the activities of that organization in the direction of savings fund contributed to by erectors and their foremen for the benefit of the latter and securing of constant employment of structural steel workers.

TRADE ASSOCIATION RIGHTS

Commerce Department Giving No Advice, but Waiting for Supreme Court Decision

WASHINGTON, Jan. 29.—The recent informal advice of Attorney General Daugherty concerning the rights of trade associations, in the estimation of Secretary of Commerce Hoover, would leave only two alternatives in the event the Supreme Court should hold that the Daugherty opinion is correct. Secretary Hoover made it clear that the Daugherty statement is a source of disturbance and that the alternatives which he spoke of would call for either the entire abandonment by trade associations of the gathering of the most ordinary sort of statistics or the recruiting of information by the Government.

Abandoning of trade association work would be practically fatal to small business interests of the country, the Secretary of Commerce said, and probably would mean that some of them would have to be absorbed by the larger business organizations or would be forced out of business. The larger business interests, the Secretary pointed out, can keep their hands on the pulse of industry much more easily than the smaller ones can, and, therefore, would suffer less in the absence of trade association work than the small business interest would.

Secretary Hoover has reconsidered his original plan to have Solicitor S. B. Davis of the Department of Commerce interpret the Daugherty statement, and, therefore, it is not likely that an opinion from Mr. Davis will be announced. It is believed that Secretary Hoover is awaiting a Supreme Court decision so as to clear up the law once and for all as it applies to the rights of trade associations to compile and distribute among their members as well as through the Government, and for the public, statistics such as those relating to production, shipments, stocks and consumption. Secretary Hoover said that no decision yet handed down has made the law clear on the subject. He pointed out that he was aware of the fact that an appeal is being made by the Cement Manufacturers' Protective Association from the recent decree of Judge Knox in New York, ordering the dissolution of the association because of alleged violation of the Sherman anti-trust act. As stated in THE IRON AGE of last week, plans for this appeal direct to the Supreme Court are already under way.

That trade associations now cooperating with the Department of Commerce are manifesting anxiety over the recent Daugherty statement is evident from the correspondence on the subject received by Secretary Hoover, as well as the number of representatives of trade associations who are calling at the Department and conferring with Secretary Hoover and Solicitor Davis. It is understood that neither the Secretary nor the solicitor has attempted to give trade association representatives any advice but is leaving the matter for their own interpretation and for such action as they may desire to take. Whether or not a number of associations will cease cooperating with the Department pending the decision of the Supreme Court on the appeal to be taken by the cement association was not made known.

The Daugherty letter made it plain that the Department of Justice considers it entirely legitimate for trade associations to compile statistics of the kind mentioned, provided that distribution is confined solely to a Government department. But, as Secretary Hoover has pointed out, there would be no incentive for trade associations to continue their work if they are not permitted to distribute the figures among their members also.

Secretary Hoover shares with the Attorney-General vigorous opposition to those associations which have used statistics in violation of the law but the Secretary maintains that the fact that a small number of associations has done this does not justify wholesale condemnation of all trade associations.

The Secretary explained that promptness in the dissemination of statistics is one of the fundamental values of effective trade association work and the elimination of the element of expeditious distribution would largely destroy the value of the work. For the Government to undertake the task would mean delay, it was stated.

This fact has been taken to indicate that Secretary Hoover would be reluctant to seek cooperation from trade associations, even if they were inclined to give it for the compilation of figures for distribution by the Department of Commerce. The great value of trade figures, however, is thoroughly appreciated by the Secretary of Commerce and it is evident that it also would be with the utmost reluctance that he would order such work abandoned if it could be carried on and provide any sort of information to business and commerce of the country, even though its value would be largely destroyed when compared with the present manner in which trade associations distribute statistics.

It as been intimated that while a number of trade associations may quit cooperating with the Department of Commerce, there are some which, it is believed, not only are willing to continue to work with the Department but will also continue to distribute statistics among themselves and are anxious to have the matter tested in the courts before giving up their work.

European automobile factories are working on a quantity production basis, according to Albert Champion, president of the AC Spark Plug Co. As a result, he says, the European automobile is a better car and a cheaper one, the market has been widened and the future holds much prosperity for the industry.

PORTABLE MICROSCOPE

New Type for Use on Metal in the Shop—Applicable to Various Shapes

The development of metallographic practice has created the demand for a handy, simple type of microscope, the usefulness of which is not confined to the laboratory but which may be conveniently employed in the shop. The usual type for metallographic work is either not conveniently adaptable to the various shapes of specimens to be inspected or else not sufficiently rigid for use in the workshop or in other places outside of the laboratory or tool room.

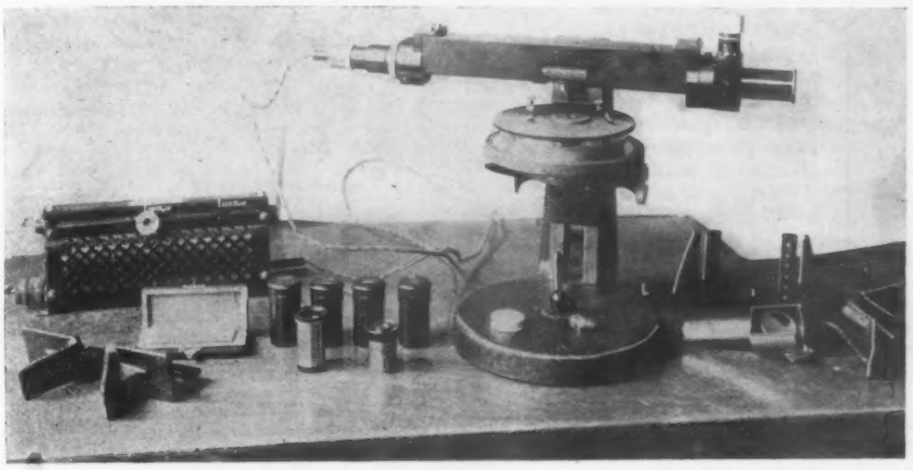
Suggestions received from the trade have induced the firm of Carl Zeiss of Jena, Germany, to design a microscope entirely different from usual lines, so as to meet the demands both of the scientific laboratory and of the shop, and to make it suitable for objects of the most diversified shapes. The instrument is sufficiently rigid and easy to apply so that it may be given into the hands of the foreman for the inspection of work during any stage of finishing or for making tests in connection with the heat-treating department, whereby valuable information about annealing periods, hardening temperatures, carbonizing media, etc., may be obtained. It has been placed in the American market by George Scherr, 143 Liberty Street, New York.

The illustrations plainly show the handiness and the wide range of applying the microscope. One illustration shows the optical arrangement. The illuminating device *a* for day or artificial light reflects the light to the prism *b* from where, by the aid of the object *c*, it is directed upon the specimen *d*. The other prism *e* directs the light reflected particularly by *d* into the ocular *f*. Another shows the microscope as used for inspecting shafts and other cylindrical pieces. The jaws required are made in two sizes and are so arranged that their distance may be varied by means of two screws. This distance should be adapted to the diameter of the work to be inspected and the focus of the objective employed and both jaws should be equally distant from the center of the lens. Adjustment is made by means of the graduation plainly shown. Where the work is likely to be repeated it is recommended to record the position of the jaws.

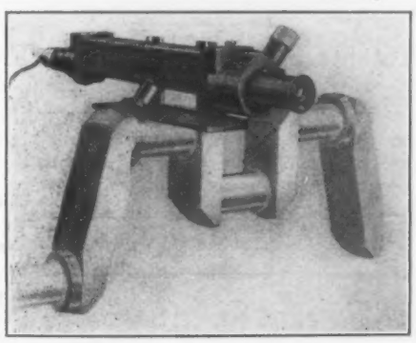
The angle plate shown in a third illustration is employed for the inspection of shoulders and fillets in crank shafts, bent shafts, eccentrics, etc. It is secured to the body of the tool in a similar manner as described above. Two graduations on the brackets of the body facilitate the recording of the position for repeating work of standard character. The tube of the microscope may be pivoted through an angle of 90 deg. and clamped in any position and thus the lens be directed against any point of the fillet.

The same angle plate may be used for observing plain surfaces. In this case the objective is set at the right angle to the surface. Other attachments for adapting the tool to various kinds of work may be easily applied by securing to the body with the two screws provided. For the inspection of small pieces and specimens the microscope may be attached to the column of a stand as shown in the large illustration.

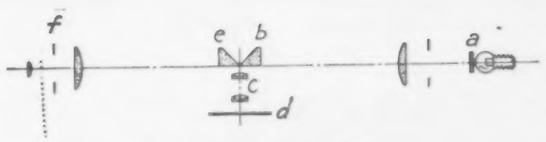
The microscope for structure testing may be illuminated by day light or by means of an electric lamp. In this case, the source of light is a low current incandescent lamp consuming 0.4 amp., the voltage being 4. The current may be either furnished by a storage battery or taken from a 110 or 220 volt current by interposing a reducing rheostat. The optical equipment consists of several achromatic objectives and Huygene oculars.



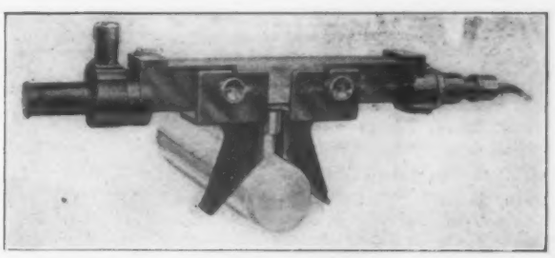
The Portable Microscope and Various Equipment



Manner of Applying the Microscope for Examination of Shoulders and Fillets



Optical Arrangement of Lenses

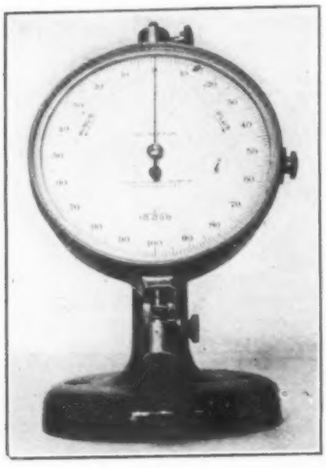


Application of the Portable Microscope to Shafts and Cylindrical Objects

New Dial Indicating Gage

The dial indicating gage illustrated, which is graduated in ten-thousandths of an inch, and has a range of ⅜ in. between the point and anvil, has been placed on the market by the Federal Products Corporation, Providence.

The spindle of the indicator may be raised and held in various positions by loosening the knurled thumb screw at the top and turning the collar. This permits rapid insertion between the anvil and the spindle point of parts to be measured, as both the anvil and spindle points are ground to a slight taper so that when the part being measured is placed between those points the spindle is raised to the desired position.



The small knurled nut on the right-hand side of the spindle and anvil housing holds an adjustable pin, which may be set to the desired distance between the bottom of the jaw housing and the anvil, and acts as a stop so that the piece being measured will rest at the highest point. A knurled set screw at the back of the indicator permits swinging the latter in the stand to the angle most convenient for the operator. The instrument is also equipped with a movable dial, which is held stationary by the bezel clamp shown at the right-hand side of the indicator.

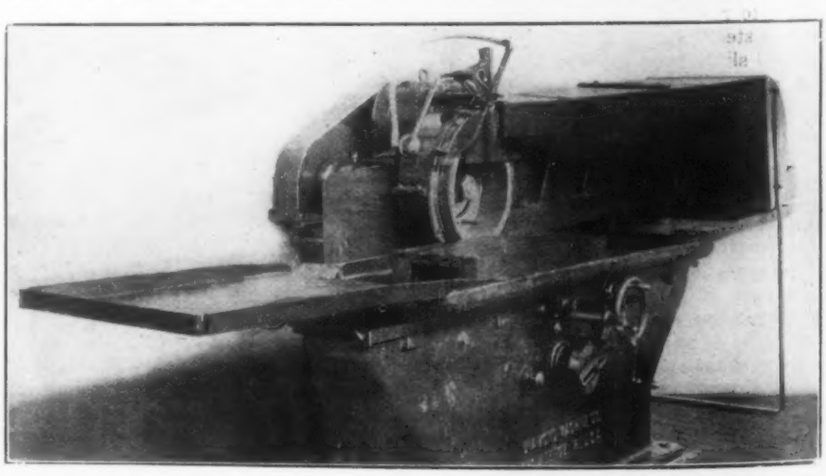
Diamond 18-In. Face Grinder

An 18-in. face grinding machine for producing flat surfaces which are usually machined on planing or milling machines and accommodating small work, thus releasing the larger machines for larger work, has been added to the line offered by the Diamond Machine Co., Providence. The machine is available in sizes having capacity to grind from 24 to 60 in. in length and 10 in. in height. If required the guard flap may be removed and the capacity increased to 14 in. in height. The table is 14 in. wide.

The abrasive wheel is of the solid-ring type and is 18 in. in diameter, 5 in. deep, has a bore of 15 in. It is held in a steel bound chuck and carried by a 3½-in. spindle, which is supported in adjustable phosphor-bronze bushed radial bearings 5½ in. long, and ball thrust bearings. The wheel is driven by silent chain from a 10-hp. 1800-r.p.m. direct current motor, or a 60 cycle 2 or 3 phase alternating current motor of standard make, according to desired conditions.

The table, which is driven by a 2-in. belt from a ¾ hp. 1200 r.p.m. motor, is equipped with crossfeed from front to rear, operated by hand. Table drive gears are of steel and have teeth cut from the solid. The rack is 1¾ in. wide. The machine is equipped with water supply having a main tank of 30 gal. capacity located within the column.

An installation in the plant of a maker of filling and weighing machinery in Chicago is claimed to have given noteworthy results in the grinding of eccentric straps. The time consumed, including oiling and care of the machine, as well as grinding, and production at the rate of 72 finished pieces an hour is claimed. In grinding other work, such as cash register parts, and meter cases, an increase in production of four times, and in some cases ten times, over previous methods of machining, is claimed.



Face Grinder for Small Work. Various sizes of the machine for work from 24 to 26 in. long and 10 in high, are available. The table is 14 in. wide

Tribute to William Banfield

The esteem in which William Banfield, formerly vice-president and general manager Follansbee Bros. Co., Pittsburgh, who recently retired from active business, was held by his associates in the sheet industry is voiced in a resolution adopted at a meeting of the operating executives section of the National Association of Sheet and Tin Plate Manufacturers at a meeting in Pittsburgh, Jan. 23. The resolution follows:

We are advised that after 20 years' faithful association as vice-president and general manager of Follansbee Brothers Co., William Banfield has retired from active duty, and is now enjoying a well deserved rest in Florida. There is no one who has attended these meetings in the past whose absence today would be more quickly noticed, whose counsel and advice will be a greater loss to this organization than that of Mr. Banfield. We have profited by his long and valuable experience; we have respected his rugged honesty; we have appreciated his counsel and guidance; we have honored him for his sense of justice and fairness as between management and men. We miss him today, and shall feel that his retirement from managerial cares is a real loss to the entire sheet steel industry; yet we rejoice that, after 50 years of active duty, he is able to enjoy the reward of a work well done. Be it therefore resolved

That the operating executives section of the National Association of Sheet and Tin Plate Manufacturers in conference this day (Jan. 23), assembled, extend to Mr. Banfield their sincere and heartfelt wishes for a healthful and happy vacation, and the hope that his span of life may be extended many years beyond the allotted threescore and ten.

Toronto Steel Plant Remains Idle

According to Sir Hugh Poynter, head of the Baldwin interests in Canada, further tariff protection is necessary to ensure the reopening of the plant of the Baldwin Canadian Steel Corporation, at Ashbridges Bay, Toronto, Ont. Prospects of a change in the tariff are very hazy, he says. "The plant at Ashbridges Bay, Toronto," he adds, "represents, roughly, an investment of $1,000,000. After erection it operated for about a year and a half, with as many as 400 men employed at a time. Production has now been suspended for about fourteen months, and the plant, fully equipped, is lying absolutely idle. This idleness costs money, and we are not inclined to stand another similar period, which might range anywhere from six months to two years. The money invested in the Toronto plant can better be employed elsewhere. The plant might be disposed of to someone who could afford to wait for more favorable operating conditions, or, failing sale, might be dismantled and much of the equipment taken to England."

Marking Machine for Cylindrical Work

A new type of marking machine for the rapid stamping of sizes, trade-marks and other designs on bushings or similar cylindrical pieces of various diameters and lengths has been placed on the market by the Noble & Westbrook Mfg. Co., Hartford. The machine is simple and positive in action and has no reversing or

Machine for Rapid Stamping of Sizes, Trade-marks and Other Designs On Cylindrical Parts. Work travels continuously from chute to marking die, and is ejected automatically into the receptacle

reciprocating parts. The work travels continuously in one direction from the feeding-in chute to the marking die, and is then thrown off automatically to a receptacle placed to receive it.

The steel stamp is attached to the face of the small vertical slide, which may be seen at the top of the machine in the accompanying illustration, and is set to a given diameter of work. By loosening a binding screw the stamp may be adjusted up or down by means of the small handwheel, this adjustment being employed to make the impression lighter or heavier, or to set the stamp for another size of work.

The principal moving part of the machine is the dial, which is a disk of tool steel, hardened and ground, having a number of V-shaped notches across its periphery. Thinner disks of soft steel, before and behind the dial, position the work-pieces endwise as these parts roll from the feeding-in chute into the notches of the continuously rotating dial. The active face of the stamp is slightly concaved to conform to the arc described by the outer surface of the work-pieces as they are rolled under it. As the work-pieces pass under the stamp, the outer surface of each is stopped by it and the piece thenceforward rotates in its V-shaped seat in the dial in the same manner that the pinion of a planetary gear train rolls between the central driving gear and the outer ring-gear.

The dial is driven through back-gears from the pulley at the rear of the machine, these gears having a ratio of 1 to 15. The capacity of the machine illustrated is for marking round pieces up to 1¼ in. in diameter. Other ranges of diameter can be handled by the same machine by substituting another dial, and longer pieces by adjusting the outer retaining disk away from the dial. The output is said to be determined by the ability of an operator to keep the chute filled with work. From 6000 to 7500 pieces an hour is regarded as a comfortable working speed.

The floor space required is 15 x 30 in. The weight of the machine with pedestal is approximately 225 lb. The pedestal may be omitted and short legs substituted to permit use of the machine on a standard work-bench.

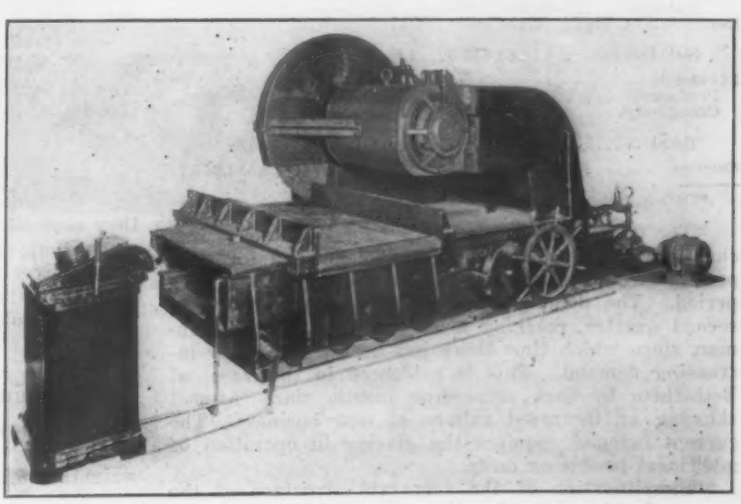
Friction Saw for Largest Sections

A friction saw designated as the No. 5 and intended for heavy-duty cutting of the largest sections rolled, has been added to the line of Joseph T. Ryerson & Son, Inc., Chicago. The added capacity of the new saw may be noted from the motor used, which is of 125 hp., the previous machine, the No. 4, employing a 60 hp. driving motor.

The machine takes a saw blade 61 in. in diameter and ⅝ in. thick. The vertical clearance under the hood and flanges is 14¾ in. The maximum sizes of I-beams, channels, angles and tees, tees and girder rails, are within the capacity of the machine. Squares of 3½ in. and rounds of 4 in. section may be cut, and also Bethlehem girder beams up to 30 in. 180 lb., with 13 in. flanges, and up to 28 in. 180 lb. with 14.35 in. flanges. Bethlehem I-beams up to 30 in. 120 lb. with 13 in. flange, and H-columns of 14 in. nominal size, 203½ lb. having 14.51 in. flange, 15⅝ in. high, are also within the capacity of the machine.

From the illustration it may be noted that the machine is of the same general type as the company's previous design except that three rollers have been added to the cutting table to facilitate handling of the heavier sections. The saw is controlled by means of two levers on the control box which may be placed where most convenient. One of these levers controls the water supply and the other moves the saw in or out of the cutting table. The feed mechanism consists of both hand and automatic feeds. A voltmeter and an ammeter are provided on the control box to permit of noting the load on the motor.

The results of a series of experiments in the production and briquetting of carbonized lignite, made under a cooperative agreement between the Department of the Interior and the University of North Dakota, are given in Bulletin 221, issued by the Bureau of Mines, Washington. Raw lignite can be converted into a satisfactory fuel of comparatively high value, admirably suited to domestic and other uses, and acceptable to the average consumer, state the authors, E. J. Babcock and W. W. Odell.



Friction Saw Driven By 125 Hp. Motor, and Designed for Heavy-Duty Cutting of Largest Sections Rolled. The saw blade is 61 in. in diameter

GOOD YEAR FOR BETHLEHEM

Net Earnings of 1923 Nearly Twice Those of 1922 —Dividends of $12,000,000 Paid

Net earnings of the Bethlehem Steel Corporation in 1923 totaled $37,373,228, which exceeds by more than 17 millions the earnings of the preceding year, and leaves a surplus sufficient to cover all dividend requirements and still show a balance of $491,853. This is the more remarkable when it is recalled that neither the Lackawanna Steel Co. nor the Midvale Steel & Ordnance Co. was paying dividends when they were acquired at the close of last March.

Directors approved the preliminary income report and declared the quarterly dividends on preferred stock and 1¼ per cent on common, payable April 1 to holders of record March 1.

President Eugene G. Grace, while reading the statement of earnings, explained that it did not include those of the Midvale and Cambria properties for the first quarter. After setting aside $4,318,253 for preferred dividends, $10,055,898 was available for common stock, equivalent to $6.46 per share on the average amount of stock outstanding throughout the year, $97,681,400 in common having been issued March 30 in part payment for the Lackawanna-Midvale properties.

Gross sales and earnings during the year amounted to $275,213,000, compared with $131,866,000 in the previous year. The total volume of business booked by the corporation, including $25,261,000 on the books of the Midvale and Cambria companies on March 30, totaled $260,968,000, against $149,212,000 in 1922. The value of orders on hand Dec. 31, last, was $53,265,000, contrasted with $53,134,000 at the close of the third quarter and $67,510,000 on Dec. 31, 1922.

Bethlehem's balance sheet as of Dec. 31, last, showed excess of current assets over liabilities of $119,724,173. In the previous year it was $87,197,190. Cash and liquid securities at the end of the year amounted to $35,521,800, against $28,237,355 a year ago. Net additions to property account for construction and acquisitions (Midvale-Cambria purchase omitted) amounted to $14,723,706. The estimated cost to complete construction in progress and authorized was $13,550,000. A comparative tabulation of the two years appears below.

	1923		
	Fourth Quarter	Year	1922
Net earnings.....	$9,935,147.41	$37,373,228.00	$19,793,712.70
Interest charges..	3,270,244.57	12,322,997.53	8,689,193.32
Balance	$6,664,902.84	$25,050,230.47	$11,104,519.38
Depreciation, etc..	2,846,460.47	10,676,078.25	6,499,188.84
Net income...	$3,818,442.37	14,374,152.22	4,605,330.54
Dividends:			
Preferred	$1,080,274.70	$4,318,253.69	$3,662,310.00
Common	2,246,315.01	7,767,073.75	3,275,706.25
Total	$3,326,589.71	$12,085,327.44	$6,938,016.25
Surplus	$491,852.66	$2,288,824.78	*$2,332,665.71

*Deficit.

"The early part of the year," said Mr. Grace, "was characterized by an unusually large demand for steel products requiring capacity operations over quite a period. The demand materially lessened during the second quarter, reaching a low point in the late summer, since which time there has been a gradually increasing demand. This is evidenced in the case of Bethlehem by each succeeding month since August showing an increased volume of new business. The current demand requires the placing in operation of additional producing units.

"Simplification of the corporate structure of the corporation has been largely accomplished during the year by making the two common stocks one and the retirement of the 7 per cent non-cumulative preferred stock, practically all of the latter having been exchanged for 7 per cent cumulative preferred stock. Approximately 40 per cent of the 8 per cent cumulative preferred stock has been converted into 7 per cent cumulative preferred stock. With this conversion completed, there will be but two classes of Bethlehem Steel Corporation stock outstanding, namely, 7 per cent cumulative preferred and the common.

"Bethlehem's outstanding problem throughout the year was the coordination of the affairs of the Lackawanna, Midvale and Cambria companies with its own. Satisfactory progress has been made but it will naturally require some time before the full benefits can be expected from the consolidation of the properties. The work of modernizing and rounding out the new properties to fit in with the enlarged Bethlehem program is being executed as rapidly as conditions will permit.

"The only new financing done by the corporation during the year was the issue in January of $25,000,000 of 5½ per cent consolidated mortgage bonds, series B, which were sold primarily to provide for refunding maturing obligations. Due, however, to the fact that certain of the maturing obligations were converted into other of the corporation's securities, that operation resulted in providing $8,373,000 cash available for capital expenditures."

To Pay War Claims of Bethlehem Steel Co. Workers

WASHINGTON, Jan. 29.—Representatives Kent and Croll, of Pennsylvania, last week introduced identical bills in the House of Representatives for the appropriation of $1,600,000 from the Treasury to discharge so-called claims of machine shop workers and other employees of the Bethlehem Steel Co., Bethlehem, Pa., for war work performed between Aug. 1, 1918, and Feb. 28, 1919. These claims are based on awards of the old National Labor Board arising from War Department contracts between the Government and the Bethlehem Steel Co. The effort to get this money is based on the so-called Dent act, passed shortly after the armistice was signed, providing for the adjustment of war claims. The bills introduced by Representatives Kent and Croll have been referred to the Committee on Claims.

Pacific Coast Steel Companies Deny Suppressing Competition

WASHINGTON, Jan. 29.—Steel companies on the Pacific Coast last week filed answers denying charges of the Federal Trade Commission that they had entered into a combination to suppress competition in the purchase of scrap material through the organization of the Steel Mill & Foundry Co., also a respondent whose answer was included in the list of those filed. The replies filed included those of the purchasing organization, the Pacific Coast Steel Co., the Columbia Steel Co., the Columbia Steel Corporation, and the Southern California Steel Co.

The Columbia Steel Co. in its answer pointed out that it had been taken over by the Columbia Steel Corporation and that it no longer had stock in the supply company. It is conceded in the answers that the supply company was organized for the purposes of purchasing scrap material for the respondents, but it is denied that they controlled the supply company, and denial is also made that these steel companies are practically the only sources of scrap consumption in the Pacific Coast States or that they used the supply company as a means of holding down prices paid for scrap.

Decimal System Bill Reintroduced

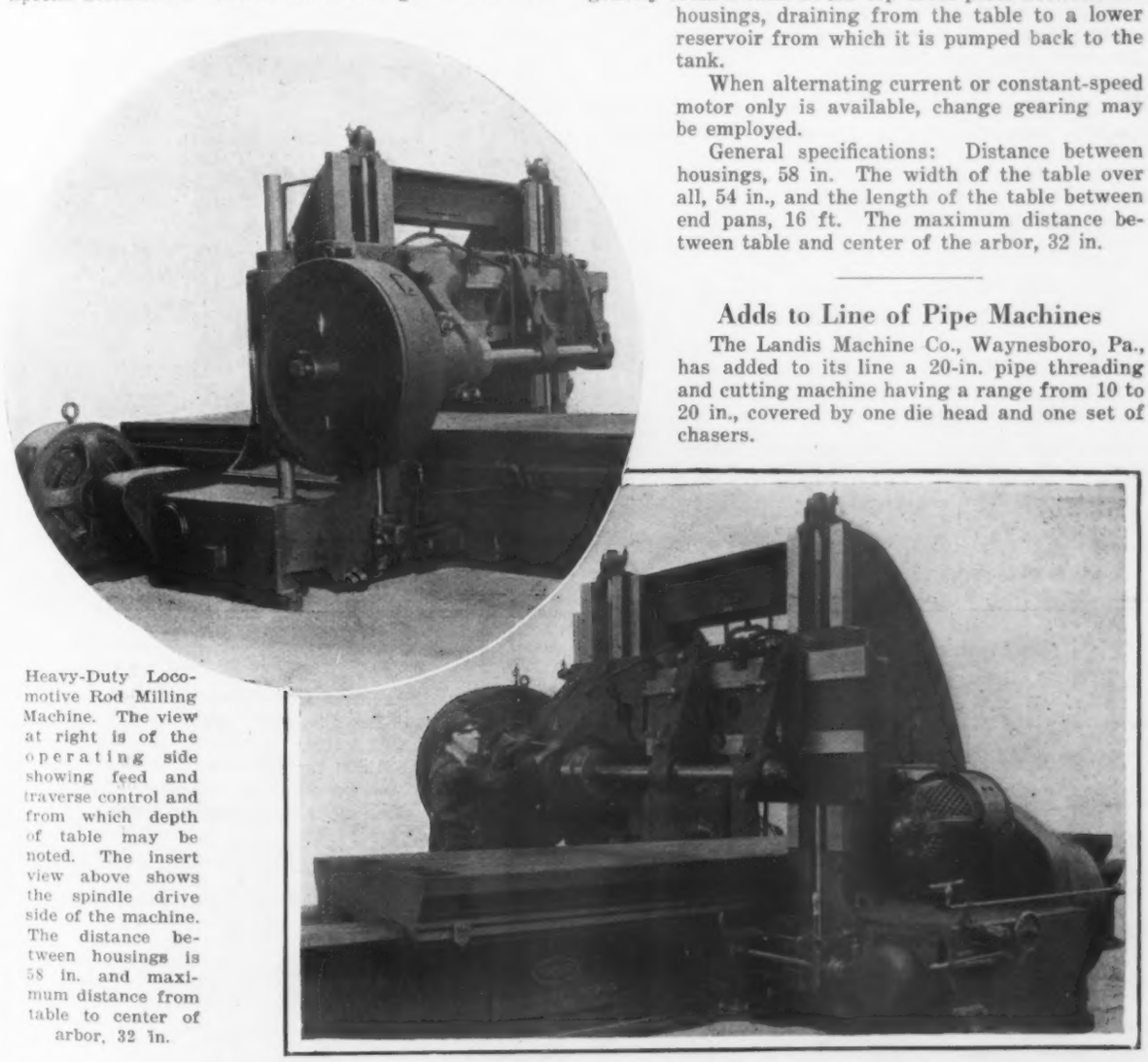
WASHINGTON, Jan. 22.—Senator King of Utah has reintroduced a bill to establish a decimal system of weights and measures in the United States.

For erecting two storage oil tanks of 80,000 bbl. capacity each for the Sinclair Refining Co., Tremley Point, N. J., an equipment of three gasoline engine driven welding machines was supplied by the Wilson Welder & Metals Co. The tanks, which are being erected by the George S. Curtiss Co., are 117 ft. in diameter, 42 ft. high and both the bottoms and roofs are to be electrically welded.

New Locomotive Rod Milling Machine

A heavy-duty locomotive rod milling machine measuring 58 in. between housings has been added to the line of machines of this class offered by the Niles-Bement-Pond Co., New York.

Equipped with a 75 hp. motor, the machine, which is illustrated herewith, is said to absorb without difficulty the full motive power, if the cutters will stand up to these demands. As further evidence of rigidity and strength the machines are claimed to be designed throughout so that should cutters that will stand the increased hard usage become available, the machines may be equipped with a 100 hp. motor, the gearing being of ample strength to transmit this extra power. Special attention is said to have been given to smooth cutting action, suitable range of table feeds for the work, convenience of manipulation and thorough lubrication.



Heavy-Duty Locomotive Rod Milling Machine. The view at right is of the operating side showing feed and traverse control and from which depth of table may be noted. The insert view above shows the spindle drive side of the machine. The distance between housings is 58 in. and maximum distance from table to center of arbor, 32 in.

The spindle is driven by a large manganese bronze worm wheel of coarse pitch, which engages a hardened steel worm with ball thrust, and both worm and worm wheel run in a bath of oil. The large diameter of the worm wheel, together with the tangent type of gearing, are intended to provide the smoothness and steadiness of action essential for eliminating chatter and preserving the edges of the cutters. The drive illustrated, which is for direct current, is simple, a variable speed motor being used, with the same range of speed as required by the cutter arbor. Full speed range is obtained without change gears.

The table has the usual power feeds and fast power traverse on the bed by separate motor, the power being transmitted by a bronze spiral pinion running in a pocket of oil and engaging with a steel rack on the under side of the table. The cross rail has rapid power adjustment in both directions as well as a power vertical feed for raising the cutter out of the work piece, the downward feed being manually operated as a safeguard against breaking cutters when sinking them into the work. Both the power feed and rapid adjustment are operated by this same motor which is so wired to the driving motor panel that it stops when the driving motor is shut off. This motor also can be used for rapid traverse of the table or rail when the driving motor is not in operation. The feed motor has a special control so that it slightly eases off its pulling power when the cutter meets unusual resistance, such as caused by excess metal or hard spots.

Complete cutting fluid circulating and draining system are provided. The fluid flows to the cutters by gravity from a tank in the top cross piece between the housings, draining from the table to a lower reservoir from which it is pumped back to the tank.

When alternating current or constant-speed motor only is available, change gearing may be employed.

General specifications: Distance between housings, 58 in. The width of the table over all, 54 in., and the length of the table between end pans, 16 ft. The maximum distance between table and center of the arbor, 32 in.

Adds to Line of Pipe Machines

The Landis Machine Co., Waynesboro, Pa., has added to its line a 20-in. pipe threading and cutting machine having a range from 10 to 20 in., covered by one die head and one set of chasers.

The machine is the same in general design as the 18-in. equipment described and illustrated in THE IRON AGE of Aug. 2, 1923. It has a single pulley drive and is provided with eight speed changes. Gears are fully inclosed, and with the exception of the driving gear, they run in oil. The machine is readily adaptable to motor drive. The length of the machine is 12 ft. 2 in. and the height 6 ft. The width of the belt driven unit is 5 ft. 10 in., and of the motor driven machine 6 ft. 8 in. The weight is 22,000 lb.

To meet the demand for welding equipment by means of which light gage sheet metal can be arc welded, the General Electric Co. has brought out a current-reducing resistor to be used in conjunction with its standard WD type welding generators. This resistor will permit the obtaining of currents of from 25 to 75 amperes.

Iron and Steel Exports Fall Once More

December Figure 10 Per Cent Below Pre-War Average—Year 1/3 Per Cent Above 1922—Imports Below Half of Year's Average—Heavy Ore Imports

WASHINGTON, Jan. 29.—Reflecting a decline of 9112 gross tons under November, exports of iron and steel products in December, 1923, aggregated 177,844 tons, valued at $21,705,600, and for the year 1923 they totaled 1,992,595 tons, valued at $234,355,360. Exports in December showed an increase of little more than 27,000 tons over the same month of 1922, when they were 150,170 tons. For the year 1923, exports were but slightly more than 6000 tons over those for 1922, when they aggregated 1,986,297 tons.

The most interesting feature of exports in December was the heavy movement to Japan of such items as black steel sheets, tin plate, rails, pipe and wire nails for use in the work of reconstruction, following the recent earthquake and fire. Exports to Japan alone in December amounted to 78,588 gross tons, or 44 per cent of the total for that month. Exports to Japan in November totaled 54,281 tons.

Exports, January, 1922, to December, 1923, Inclusive
(In Gross Tons)

	All Iron and Steel	Pig Iron	Semi-Finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	132,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,902	2,786	7,733
March	163,920	2,881	11,416
April	177,471	1,844	11,247
May	203,389	1,848	16,859
June	171,183	2,960	12,278
Fiscal year 1923	1,816,329	31,891	137,757
July	168,558	2,966	8,357
August	161,426	3,117	11,232
September	172,499	2,148	12,610
October	152,511	3,294	13,442
November	186,956	3,198	16,347
December	177,844	2,750	11,073
Calendar year 1923	1,992,595	32,318	152,748

*Calendar years.

Machine Tool Exports

	November, 1923		December, 1923	
	Number	Value	Number	Value
Lathes	128	$151,003	66	$82,535
Boring and drilling machines	266	75,555	220	56,771
Planers, shapers and slotters	22	19,500	5	3,962
Bending and power presses	37	64,000	21	25,970
Gear cutters	65	65,656	47	33,336
Milling machines	32	36,871	28	33,897
Thread-cutting and screw machines	21	12,672	57	62,725
Punching and shearing machines	15	6,961	12	9,061
Power hammers	45	12,821	21	10,645
Rolling machines	3	9,346	1	12,000
Sharpening and grinding machines	355	130,381	733	37,807
Chucks, centering, lathe, drill and other metal-working tools	2,254	28,056	3,071	25,389
Pneumatic portable tools	1,266	85,637	1,143	73,467
Totals	4,509	$698,459	5,425	$467,565

Imports of Iron and Steel Into the United States
(In Gross Tons)

	Dec., 1922	Dec., 1923	12 Months Ended Dec., 1922	12 Months Ended Dec., 1923
Pig iron	54,728	12,355	383,445	367,820
Ferromanganese	5,160	1,907	94,592	88,570
Ferrosilicon	1,052	400	14,492	11,550
Scrap	28,602	4,500	142,969	162,026
Steel ingots, blooms, billets, slabs and steel bars	1,760	2,300	27,719	22,667
Rails and splice bars	991	935	26,628	29,705
Structural shapes	1,447	1,627	7,823	10,672
Boiler and other plates	147	106	1,141	1,820
Sheet and saw plates	17	264	381	2,732
Bar iron	1,170	393	8,089	7,760
Tubular products	265	800	879	4,960
Castings and forgings	81	246	402	2,703
Nails and screws	84	78	220	1,093
Tinplate	347	186	2,682	10,032
Bolts, nuts, rivets and washers	15	14	50	216
Wire rods	277	337	1,725	3,948
Round iron and steel wire	136	278	648	3,889
Flat wire and strip steel	66	266	280	1,480
Wire rope and insulated wire, all kinds	50	17	59	956
Total	96,395	27,009	714,224	734,599
Manganese ore	18,305	12,003	374,451	206,048
Iron ore	167,221	157,190	1,135,156	2,768,430
Magnesite	3,504	9,169	119,872	76,815

Exports of machinery in December were valued at $23,412,530 and, for the year 1923, at $288,207,724. These compare with values of $23,396,715 in December, 1922, and $239,331,200 for the year 1922. November, 1923, exports of machinery were valued at $25,218,724. Exports of machine tools in December totaled 5425 in number, with a value of $467,565, as against 4509, valued at $698,459, in November.

Imports of iron and steel in December totaled 27,009 tons, valued at $2,064,465 and, for the year 1923, they aggregated 734,599 tons, valued at $31,035,838. Imports in December, 1922, due to heavy incoming ship-

Imports of Iron and Steel in Gross Tons
(Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,505	†14,132	....	....
1914 to 1918, incl.	23,351	4,645	3,281	‡47,155
1919 to 1921, incl.	23,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	75,885	39,764	10,482	12,734
June	68,019	30,033	12,794	36,138
Six months' average	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824
August	45,439	14,564	7,334	23,026
September	36,611	8,353	9,744	35,175
October	29,882	9,349	9,372	16,842
November	26,364	9,299	5,073	14,790
December	27,009	12,355	2,307	12,003
Twelve months' average	61,217	30,652	8,343	17,171

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918 only.

Machinery Exports from United States

(By Value)

	December, 1922	December, 1923	Twelve Months Ended December, 1922	Twelve Months Ended December, 1923
Locomotives	$706,699	$425,669	$8,663,764	$4,421,9
Other Steam Engines	163,839	29,528	2,328,235	1,166,5
Boilers	62,199	141,188	1,240,106	1,432,9
Accessories and Parts	343,703	342,086	3,184,402	3,961,142
Automobile Engines	275,532	280,168	5,132,754	5,342,029
Other Internal Combustion Engines	476,498	474,563	4,482,936	,831,929
Accessories and Parts for	210,738	234,600	2,7	,402,991
Electric Locomotives	140,703	251,878	1,078,207	,314,367
Other Electric Machinery and Apparatus	641,216	832,525	7,887,484	8,821,921
Excavating Machinery	92,191	151,103	1,451,827	1,634,522
Concrete Mixers	56,764	55,655	552,041	567,635
Road Making Machinery	44,229	60,420	363,046	921,492
Elevators and Elevator Machinery	183,000	296,494	2,655,817	2,724,784
Mining and Quarrying Machinery	642,794	2,901,220	6,570,734	10,137,068
Oil Well Machinery	312,914	496,764	4,231,057	6,626,079
Pumps	547,763	642,938	6,047,902	7,465,132
Lathes	106,818	82,535	776,874	1,094,060
Boring and Drilling Machines	82,266	56,771	610,924	722,402
Planers, Shapers and Slotters	28,169	3,962	295,939	236,808
Bending and Power Presses	20,146	25,970	313,529	385,896
Gear Cutters	9,838	33,336	114,363	237,696
Milling Machines	32,095	33,897	378,137	455,906
Thread Cutting and Screw Machines	29,977	62,725	212,412	524,443
Punching and Shearing Machines	8,534	9,061	146,005	177,690
Power Hammers	11,974	10,645	130,279	155,279
Rolling Machines	1,460	12,000	161,355	40,195
Sharpening and Grinding Machines	100,391	37,807	826,698	1,008,786
Other Metal Working Machinery and Parts of	739,352	318,792	5,837,849	4,641,400
Textile Machinery	847,490	501,233	13,725,640	9,043,677
Sewing Machines	972,883	1,008,153	7,384,712	9,211,038
Shoe Machinery	117,825	92,263	1,053,853	1,324,256
Flour-Mill and Gristmill Machinery	170,569	88,293	1,207,426	1,155,485
Sugar-mill Machinery	260,565	482,093	3,798,536	6,022,794
Paper and Pulp Mill Machinery	173,833	111,691	1,826,904	2,006,812
Sawmill Machinery	52,288	39,416	601,401	617,118
Other Woodworking Machinery	153,883	116,714	1,443,433	1,137,215
Refrigerating and Ice Making Machinery	196,224	173,490	1,906,218	2,264,867
Air Compressors	184,166	292,188	2,217,605	2,627,546
Typewriters	1,237,964	1,294,667	11,573,970	13,821,480
Power Laundry Machinery	138,694	84,444	742,995	1,006,865
Typesetting Machines	292,852	420,590	3,827,684	3,889,739
Printing Presses	748,537	407,343	4,155,441	4,603,321
Agricultural Machinery and Implements	2,926,346	2,464,272	29,491,153	31,485,665
All Other Machinery and Parts	8,830,794	7,531,380	85,998,692	118,536,771
Total	$23,396,715	$23,412,530	$239,331,200	$288,207,724

Exports of Iron and Steel

(In Gross Tons)

	December 1922	December 1923	Twelve Months Ended December 1922	Twelve Months Ended December 1923
Pig iron	3,136	2,750	30,922	32,318
Ferromanganese	43	2	1,107	4,295
Ferrosilicon	196	.....	689	714
Scrap	2,761	5,111	64,572	65,678
Ingots, blooms, billets, sheet bar, skelp	8,449	4,583	107,201	111,881
Iron bars	.....	343	.....	12,660
Steel bars	*14,123	11,000	*173,075	158,315
Alloy steel bars	393	50	4,416	2,148
Wire rods	1,498	6,490	40,424	40,867
Plates, iron and steel	11,300	7,034	100,984	115,459
Sheets, galvanized	6,634	7,376	109,320	114,748
Sheets, black steel	5,477	36,642	214,911	139,103
Sheets, black iron	989	640	11,692	14,157
Hoops, bands, strip steel	3,756	1,935	34,511	38,240
Tin plate, terne plate, etc.	6,513	17,609	76,629	124,452
Structural shapes, plain material	17,516	6,078	136,943	122,066
Structural material, fabricated	5,076	3,657	47,223	78,529
Steel rails	17,481	21,565	279,105	267,409
Rail fastenings, switches, frogs, etc.	3,409	3,279	38,327	39,586
Boiler tubes, welded pipe and fittings	16,931	15,410	178,518	193,640
Cast iron pipe and fittings	3,019	1,832	28,227	28,057
Plain wire	7,459	7,261	112,970	92,231
Barbed wire and woven wire fencing	5,214	5,711	73,591	74,843
Wire cloth and screening	108	137	1,526	1,962
Wire rope	379	422	4,619	6,257
Wire nails	2,814	6,490	55,022	45,979
All other nails and tacks	607	629	8,384	8,758
Horseshoes	115	89	987	951
Bolts, nuts, rivets and washers, except track	1,564	1,402	18,097	18,905
Car wheels and axles	1,888	973	17,508	20,591
Iron castings	955	827	10,188	10,044
Steel castings	171	321	2,210	4,734
Forgings	172	196	2,171	3,018
Machine screws	24	.....	228	.....
Total	150,170	177,844	1,986,297	1,992,595

*Includes both iron and steel bars.

Sources of American Imports of Iron Ore

(In Gross Tons)

By Countries

	Dec., 1922	Dec., 1923	12 Months Ended Dec., 1922	12 Months Ended Dec., 1923
Spain	181	.....	47,111	214,891
Sweden	22,386	24,336	317,539	749,765
Canada	317	7	2,840	24,710
Cuba	60,100	32,300	381,746	692,979
Other countries	84,237	100,547	385,920	1,086,085
Total	167,221	157,190	1,135,156	2,768,430

Imports of Machinery

(By Value)

	December 1922	December 1923	Twelve Months Ended December 1922	Twelve Months Ended December 1923
Metal-working machine tools	$27,038	$63,659	$248,105	$423,175
Agricultural machinery and implements	205,321	310,688	2,558,714	2,935,555
Electrical machinery and apparatus	14,609	42,241	*70,588	511,233
Other power generating machinery	309,068	17,103	*538,856	1,783,622
Other machinery	136,535	276,682	2,608,817	2,681,733
Vehicles, except agricultural	196,815	182,577	1,566,547	2,735,593
Total	$889,386	$892,950	$7,591,627	$11,070,911

*Beginning Sept. 22, 1922.

Exports by Countries of Destination

(In Gross Tons)

	Dec., 1923	12 Months Ended Dec., 1923
Plates:		
Canada	4,324	92,381
South America	20	1,126
Japan	174	1,159
Cuba	71	932
Philippine Islands	....	570
Mexico	3	714
Galvanized Sheets:		
Canada	805	29,785
Cuba	372	12,998
Chile	67	2,857
Argentina	132	5,063
Philippine Islands	584	7,825
Central America	249	4,112
Japan	3,533	8,917
Mexico	235	6,333
Colombia	191	4,534
Black Steel Sheets:		
Japan	33,347	74,749
Canada	1,880	49,136
Argentina	....	1,976
Cuba	74	1,936
Philippine Islands	93	275
Tin Plate:		
Canada	1,741	29,562
Japan	8,216	35,808
Argentina	827	7,291
Uruguay	173	3,497
China	3,048	12,877
British India	....	6,465
Chile	268	2,458
Cuba	445	4,954
Mexico	174	2,341
Hong Kong	1,108	3,353
Italy	....	2,267
Barbed Wire:		
Cuba	503	9,353
Argentina	224	8,243
Australia	137	2,491
Mexico	278	4,003
South Africa	255	5,599
Colombia	422	4,409
Brazil	1,212	11,703
Canada	1,513	6,303
Steel Rails:		
Canada	3,203	61,445
Japan	12,097	91,718
Cuba	2,527	45,554
Chile	....	5,320
Brazil	793	4,849
Philippine Islands	318	5,105
Chosen	....	3,293
Honduras	76	8,871
Kwang Tung	....	11,143
Argentina	....	1,272
Mexico	116	3,323
Colombia	54	3,249
Galvanized Wire:		
Japan	3,171	23,825
Argentina	412	12,776
Canada	1,645	15,501
Australia	361	6,891
Brazil	749	9,785
Mexico	281	3,977
Cuba	126	2,572
United Kingdom	154	2,544
Chile	....	4,205

ments of pig iron and scrap, reached the total of 96,395 tons but, for the year 1922, imports were only 714,224 tons, or 20,000 tons less than they were last year.

Imports of pig iron in 1922 amounted to 383,445 tons, as against 367,820 tons in 1923. Imports of iron and steel for November, 1923, were only 26,364 tons. Incoming shipments of iron ore in December totaled 157,190 tons and, for the year 1923, they reached the high total of 2,768,430 tons. Imports of machinery in December, 1923, were valued at $892,950, compared with $889,386 in December, 1922, and, for the year 1923, they were valued at $11,070,911, compared with $7,591,627 in 1922.

Black steel sheets constituted the greatest item of export in December, 1923, outgoing shipments of this product for that month amounting to 36,642 tons. Practically all of this total was taken by Japan, exports to that country being 33,347 tons. Of the total exports of 139,103 tons of black sheets in 1923, Japan took 74,749 tons, or 53.7 per cent.

Of steel rail exports amounting to 21,565 tons last December, Japan took 12,097 tons and, of the total steel rail exports in 1923, amounting to 267,409 tons, Japan took 91,718 tons. Of the 17,609 tons of tin plate exported in December, 1923, Japan took 8216 tons. Tin plate exports in 1923 aggregrated 124,452 tons, of which Japan took 35,808 tons. Of the 6490 tons of wire nails exported last December, Japan took 4711 tons, and of the total wire nail exports of 45,979 tons in 1923, Japan took 19,457 tons.

Comparing exports for the year 1923 with those for 1922, there was a gain of 14,500 tons of plates, 5400 tons of galvanized sheets, 2500 tons of black iron sheets, 3700 tons of hoops, etc., 48,000 tons of tin plate, 31,300 tons of fabricated structural steel, 15,000 tons of boiler tubes, etc., 3000 tons of car wheels and axles and 2500 tons of steel castings. There was a decrease of 4400 tons in total bars, of 76,000 tons in black steel sheets, in spite of Japan's recent needs and of the fact that December, 1923, showed a gain of 31,000 tons over December, 1922. Plain structural shapes declined 15,000 tons; rails, 12,000 tons; wire, more than 20,000 tons; wire nails, 9000 tons. Japan took 363,668 tons of our 1923 exports, compared with 602,281 tons in 1922.

HIGH COST OF STRIKES

Secretary Writes About Past Labor Troubles in Coal Region and Advises Association

WASHINGTON, Jan. 29.—Agreement between soft coal operators in the central field and the United Mine Workers is urged by Secretary of Commerce Hoover in a letter addressed to Acting Commissioner C. J. Goodyear of the Pittsburgh Coal Producers' Association, Pittsburgh, and made public today. The letter is a reply to a communication from Mr. Goodyear seeking the advice of the Secretary as to the participation of the association in the forthcoming joint conference at Jacksonville, Fla., Feb. 11. The purpose of the conference is to consider the renewal of a wage agreement covering the "central competitive field" in the soft coal industry, of which the association comprises a part.

Mr. Hoover advises that representatives of the association, together with other representatives from the central field, should make "every proper endeavor to continue an agreement with the United Mine Workers and thus avoid suspension of coal production." Mr. Hoover states that "It is, of course, assumed that the conference will consider only wages and conditions of labor."

The Secretary pointed out that continuous operation is the one thing that will stop the economic degeneration that has been going on in this industry for years.

"I do not need to repeat that the soft coal industry is in a very bad condition," says the Secretary. "There are more than 30 per cent too many mines. They are giving only part time employment to 30 per cent too many employees. The real cure is a period of continuous operation under free competition and full movement of coal.

"The main reason for the bad functioning of the industry is that we have for many years had periodic strikes and lockouts together with car shortages, each of which has resulted in coal famines to the consumer, accompanied by outrageous prices. For periods in between we witness gluts of coal sold at a loss. Large numbers of mines have come into existence which can make profits solely out of these famines, thus creating this long train of consequences in speculative development and irregular employment. While daily wages in this industry are theoretically among the highest in the country, yet practically the earnings of a considerable fraction of the mine workers employed but part time are comparatively low and from their difficulties we have a constant center of discontent.

"The continuous smooth operation of the mines over a term of years without these interruptions would result in the elimination of producers who depend on famine prices by the ordinary processes of competition. It would result in a concentration of labor in more continuous employment in the more economically worked mines. It would render the business of the lower cost operators more stable. The prices of coal would be lower because the surplus of mines and labor are a charge on the consumer in the end. I believe we have now overcome most of the transportation difficulties. It remains to eliminate the frequent suspensions which arise from serious friction in employment relations.

"That the public pays heavily for these suspensions can be made entirely clear by taking the history of only the last two years. For some months prior to the suspension in 1921 the average price of spot soft coal at the mine was about $2.25 per ton and since the effect of the suspension wore off it has averaged about $2.30. Yet during a period of 14 months during and following the strike, the average price was nearly $4. If we apply the increase to the amount of coal produced or sold during the period of 14 months mentioned above, even making a large deduction for the cheaper contract coal, it is certain that the public paid three or four hundred million dollars additional for coal due to the suspension."

Expansion Plans of Ford Motor Co. Include New Blast Furnaces

The Ford Motor Co., Detroit, is planning the erection of additional blast furnaces at its River Rouge plant and the building of a large coal handling plant. It is Henry Ford's intention, as stated by a close associate, eventually to manufacture all the steel that his automobile and tractor plants consume. The Ford company at present has two blast furnaces, most of the output of which is consumed by the Ford foundries and by outside foundries as well as steel plants for making castings and finished steel for Ford cars. Ford engineers have been working on steel plant plans for some time. Last summer the Ford company began to ship ore direct to its River Rouge plant. It plans now to erect a coal handling plant so that it will have return cargoes of coal to take to northern Lake ports. The company also has under construction two large lake ore boats for hauling ore from its own and other Lake Superior district mines to its blast furnaces. With the building of these boats and the coal handling plant, Mr. Ford, with his Detroit, Toledo & Ironton Railroad, will own a through rail-water transportation line for coal from southern Ohio coal mines to upper Lake ports. It is stated that it will probably be a year or two before definite action will be taken on the construction of the coal handling plant and additional blast furnaces.

The first cargo of steel rails to move through Charleston, S. C., in some time will be loaded by the steamship Bantu, which will take 2000 tons of steel rails to be shipped to Valparaiso, Talara, and Callao, Chile. The steel is to come from Birmingham, moving by rail from the interior.

Quality of Electric and Open-Hearth Steels

Metallurgical Conditions During the Settling-Up Period Compared—Basic and Acid Slags—Factors Favoring Clean Steel

BY B. E. L. DE MARÉ*

THE three steel-making processes which are compared in this article are:

1. The basic electric process.
2. The acid open-hearth process
3. The basic open-hearth process.

The object of the comparison is to explain the metallurgical conditions during the final, or settling-up, period of each process, which determines the quality of the steel produced, and thus to show the possibilities of modifying these conditions in order to improve this quality as far as possible.

By quality, I am not concerning myself here with the physical properties of steel, depending on a certain chemical composition, or by the advantages that any one of the three processes may have in producing a steel of such a composition, but I assume that in each case we are dealing with steel that can be made without any special difficulty by any one of the three processes, as for instance, a plain carbon steel with normal contents of manganese and silicon, and with phosphorous and sulphur fairly low, or below 0.04 per cent.

Measuring the Quality of a Steel

The physical properties, by which the quality of a steel is measured, are the tensile strength, elastic limit, elongation and contraction of area, as shown not only by longitudinal tests, that is, with the axis in the direction of forging or rolling, but also by transverse or radial tests, taken at right angles to this direction, and by bending tests, drop tests, and tests to determine the resistance of shock and fatigue. Also for special purposes, polishing tests for quality of surface, and case-carburizing tests for uniform surface hardness.

As determined by these various tests, the three classes of steel under consideration range themselves in the following order according to quality:

First—Basic electric steel.
Second—Acid open-hearth steel.
Third—Basic open-hearth steel.

The reason for this is that electric steel is cleaner, or less contaminated by inclusions of non-metallic impurities, than acid open-hearth steel, and this latter shown by innumerable macroscopic and microscopic examinations of fractured steel, as well as by chemical determinations of the total contents of oxides in the steel. Their bad effects are shown by a general unreliability and brittleness, especially where they are collected in patches or streaks, by their acting as starting points for cracks on account of the discontinuity in the metal caused by them, the cracks spreading from spot to spot, following paths of least resistance, and by their acting as centers of corrosion on account of forming electro-negative substances in the steel.

Troubles Caused by Impurities

The following are some of the troubles caused by them:

1.—Failure of transverse tests, as required for the acceptance of heavy ordnance, bucket wheels for steam-turbines, certain hollow forgings, etc., on account of streaks of slag across the tests and "woody" fracture.

2.—Failure of armor piercing projectiles, die blocks for drop forging, etc., on account of cracks caused by their presence, both during the heat treatment and later by the severe strains such forgings are subjected to.

3.—Breakage of piston rods, crank and line shafts, railroad axles, rails, automobile parts, etc., which are more or less exposed to fatigue and vibration strains, to the pounding of heavy loads, and the embrittling effect of cold weather, etc.

4.—Blisters, flakes and shells on the surfaces of sheets, cold rolled strip steel, etc., and breakage for lack of ductility in bending and deep drawing.

5.—Breakage of steel wire while being drawn, especially after being reduced to a small gage, and general unreliability on account of brittleness.

6.—Condemnation of hardened rolls on account of "sandsplits" or spots, shown after the rolls have been polished.

7.—Soft spots on the case-carburized surface of parts for ball and rolled bearings, etc.

The Various Slags

The chemical composition of the final slags is the best indication of the oxidizing or non-oxidizing conditions of the various processes, and also of the care and skill with which the furnaces have been handled during the settling-up periods. The following are typical examples of such slag which may be considered favorable as to the quality of the steel produced:

	Per Cent CaO	Per Cent MgO	Per Cent MnO	FeO and Fe_2O_3	Per Cent Al_2O_3	Per Cent P_2O_5	Per Cent SiO_2	Per Cent CaC_2	Per Cent S
Basic electric slag.....	63.0	16.0	0.6	0.8	5.0	0.1	12.0	1.3	0.40
Acid open-hearth slag.....	2.5	0.5	16.5	15.0	1.5	0.0	63.0	0.0	0.0
Basic open-hearth slag.....	50.0	6.0	8.0	14.0	3.0	3.0	15.0	0.0	0.07

cleaner than basic open-hearth steel. These non-metallic impurities consist chiefly of the oxides of iron, manganese and silicon, forming what may be called secondary slag, different in composition from the primary or furnace slag. Accompanying these oxides, may also be found a certain amount of manganese sulphide. Now every one of the various tests for quality are more or less affected by these non-metallic impurities in the steel, which vary according to the oxidizing or non-oxidizing conditions in the furnace, especially during the settling-up period of each process.

That these impurities actually are the chief factors as far as the quality of the steel is concerned has been

Of the various oxides making up the composition of these slags, by far the most active one is the iron oxide, and on the amount of this oxide, on the form in which it occurs, and on its chemical affinity to the other components of the slag, depend the oxidizing or non-oxidizing qualities of the slag.

This is one of the most important points in the metallurgy of steel because on the quality of the slag, and on the length of time of contact between the steel and the slag, depends the quality of the steel, because, between the oxidizing or non-oxidizing qualities of the slag and the amount of oxide dissolved in the steel, there is an

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equilibrium, or a tendency to get into equilibrium, which is attained, provided sufficient time is allowed for this reaction to be carried to a finish.

The length of time required, depends of course on the mass of steel in the furnace and its area of contact with the slag. It is comparatively short for a 5-ton heat, and considerably longer for a 150-ton heat, the area of contact between the steel and the slag per unit weight of metal steadily decreasing with the increasing size of the furnace.

At the end of the settling-up period, in order to remove the red shortness of the steel caused by dissolved iron oxide and make it fit for forging or rolling, certain deoxidizers are added, chief among which are manganese, silicon and aluminum, which reduce part of the iron oxide in the steel by themselves becoming oxidized. This reaction, however, is never carried to a finish, nor do the new oxides all have a chance to rise to the surface and combine with the slag. Therefore this condition cannot possibly make up for the lack of a deoxidized condition of the steel as a result of the settling-up period, that is to say, it cannot make basic open-hearth as good as acid open-hearth steel, nor this latter as good as electric steel.

In addition to the three so-called deoxidizers already mentioned, there are others, such as titanium, zirconium and magnesium, for which certain advantages are claimed, but the same principle holds good with them; to clean the steel by reducing the iron oxide in the steel, they must themselves become oxides, or they would have no effect as deoxidizers. The one and only element, which is able to deoxidize the steel without leaving trace of non-metallic impurities, is carbon, for the simple reason that in reducing iron oxide by itself becoming oxidized, it forms monoxide of carbon, which is gas. Some of this gas may be held in solution, and may cause blow-holes as the steel solidifies in the molds, but it will never cause "dirty" steel, that is, steel containing solid non-metallic impurities.

Oxidizing Quality of Slag

The conditions which determine the oxidizing quality of the slag are:

1.—The furnace atmosphere above the slag. The more oxidizing this atmosphere is the higher will be the content of iron oxide in the slag, all other conditions being similar. In electric furnaces, provided the furnace itself is air tight, this atmosphere is practically non-oxidizing, on account of the heat being generated not by fuel combustion but by the electric arcs.

In the acid and basic open-hearth furnaces, the atmosphere is always oxidizing. To speak about a "neutral" flame, as sometimes is done, is a misnomer. Wherever there is a flame, there is free air, as without free air to carry on the combustion, there would be no flame. Also wherever there is a flame, there are the oxidizing products of combustion, CO_2 and H_2O. This atmosphere, however, may be more or less oxidizing depending on the kind and quality of fuel used, on the design of the furnace and of its gas and air ports, on the temperatures of the preheated gas and air, and on the regulation of the relative amount of gas and air admitted to the combustion chamber.

2.—On the amount of carbon in the steel and on its temperature. This carbon is the one and only reducing agent during the settling-up period, where there is an oxidizing atmosphere above the slag, which affects the quality of the slag. The higher its temperature, the greater will be its reducing power on the oxides in the slag as well as in the steel, and the higher the carbon content in the steel, the greater will also be its reducing effect, according to the law of mass-action.

3.—The material used in the bottom of the furnace, whether acid or basic. On this depends of course the proportion as well as the composition of the acids and bases in the slag and hence, under similar conditions of the atmosphere above the slag and the steel below the slag, the oxidizing effect of the slag on the steel. Also on this depends what fluxes are available for modifying the composition and fluidity of the slag.

4.—The temperature of the slag. The higher this temperature, the more acid will be the acid slag, and the more basic will be the basic slag. If now the temperature of the slag is lowered, on account of some obscure law of nature, the slag will strive to retain its fluidity, the acid slag by combining with any base within reach, such as FeO, the basic slag by combining with any acid within reach, such as P_2O_5. The fact that basic slag, under such a condition, also combines with iron oxide leads one to believe, that in this case the iron oxide goes into combination as the ferric oxide Fe_2O_3, and should be classified as an acid.

Referring again to the composition of the three slags as already given, it is plainly to be seen how profoundly the difference in these various conditions has modified the composition of the slag according to the process used. Take first the basic electric slag. It shows how important is the non-oxidizing condition of the furnace atmosphere and the high temperature produced by the electric arcs, giving the carbon in the steel, aided in this case by the addition of carbon to the slag, a preponderant power of reducing the oxides. The weaker oxides, FeO and MnO, as well as the weaker acid P_2O_5 have been practically eliminated, the slag made exceedingly basic, with high CaO and MgO, and under the intense heat of the electric arcs, the carbon has even reduced a small proportion of CaO, some of the nascent Ca combining with carbon to form a carbide, some with sulphur in the form of sulphide.

It is hardly necessary to point out how much superior, that is, how much less contaminated by non-metallic impurities, electric steel consequently will be, as compared to open-hearth steel, especially considering the comparatively small mass of steel in the electric furnace to be brought into equilibrium with the slag.

The Open-Hearth Slags

Coming next to the two open-hearth slags, it is a well-established fact that they differ in their oxidizing effect on the steel, the acid being less oxidizing than the basic slag under similar conditions as to furnace atmosphere and as to the temperature and amount of carbon in the steel.

The reason for this is that in the acid slag practically all the iron is present as a base of ferrous oxide, FeO, firmly held, together with the other chief base, MnO in chemical combination with a strong acid, SiO_2.

In the basic slag on the other hand, the iron occurs both as ferrous oxide, FeO, and ferric oxide, Fe_2O_3. On account of the presence of stronger bases, CaO, MgO, and MnO in combination with the three acids Al_2O_3, P_2O_5, and SiO_2, the iron oxides are comparatively weak and loosely held in combination, and therefore, more free to act as oxidizers on the steel. Moreover part of the iron being present as Fe_2O_3, this higher oxide adds to the oxidizing effect of the slag. As already mentioned, it is probable that this ferric oxide should be classified as an acid, which in addition to explaining its effect on the fluidity of the slag, would also explain the fact, that iron oxide in basic slag acts as a substitute for SiO_2, the total amount of the two, with a constant amount of P_2O_5, making up an approximately constant percentage of the slag. Each may vary between wide limits, but when one is low, the other is proportionately high, and vice versa. In fact, the only rational way of explaining the reactions of basic open-hearth slag during the settling-up period is to classify the ferric oxide as an acid.

Producing Clean Steel

Having explained the metallurgical conditions during the settling-up period, which determine the quality of the steel produced, let us now see what may be done to make these conditions as favorable as possible for the production of clean steel.

1.—In the case of the electric process, the furnace must be as air-tight as possible to insure a non-oxidizing atmosphere. All brick-work should be laid with tight joints, the walls inclosed with a mantel of steelplate, water-cooled doors and lintels used to make them tight-fitting, and leaks of hot gases prevented through the roof around the electrodes, as otherwise these openings would act as a chimney to pull air into the furnaces.

Following the removal of the first or oxidizing slag, and the addition of the second or reducing slag, the bath must be brought up to a very high temperature to carry out the chemical reactions of the settling-up period, and sufficient time allowed to bring steel and slag into equilibrium. During this period, by the action of the carbon in the steel, aided by the carbon added on top of the slag in the form of powdered coke, both the steel and the slag will be thoroughly de-

oxidized, as shown by the composition of the final slag. When this is attained, may be judged by the behavior of the slag, which will then crumble as it cools in the air into fine, white powder.

2.—With the acid open-hearth process it is not here necessary for me to go into details, having already done so in a paper read before the American Iron & Steel Institute. (See "The Acid Open-Hearth Process" in the Year Book of the American Iron & Steel Institute for 1920. Also THE IRON AGE, June 3, 1920.) It is sufficient to state, that certain conditions pertaining to the basic open-hearth process, next to be dealt with, also applies to the acid process.

3.—The basic open-hearth process is by far the most important of the three here considered. It is the chief tonnage-producing process and naturally, where tonnage is the main consideration, quality as a rule is treated as of secondary importance. But even in tonnage production, the steadily increasing demand for improved quality is making itself felt, until it has become of the very greatest importance to study very carefully every possible way to improve the quality without too great a sacrifice in tonnage.

In this regard, the crucible and Bessemer processes offers us an object lesson. The former, although having been in use for over 100 years before the latter was invented, or since the year 1740, still makes the very best steel produced. As Brearly puts it: "It is still a great virtue of crucible steel that it contains less occluded slag than steel made by any other process." This holds good as long as it is carried out in the old-fashioned way, without the addition of a "bill" of aluminum to shorten the time of the heat. Bessemer, on the other hand, makes the poorest steel, because it contains more occluded slag than steel made by any other process.

The difference between the two steels is caused by the crucible process being mainly a settling-up process with the exclusion of atmospheric oxidation, while the Bessemer process is mainly an oxidizing process, compressed air being forced through the steel, and with practically no time allowed for deoxidizing it by a subsequent settling-up period.

The former, in spite of small production at high cost, is surviving, while the latter, in spite of maximum production at low cost, has been steadily losing ground.

Conditions for Making High Quality Steel

The four conditions which determine the oxidizing quality of the slag will now be considered in connection with the basic open-hearth process.

Sharp Working Furnaces.—The first and most important condition for making steel of high quality as well as for turning out a great tonnage, is to have sharp working furnaces, which will melt the charge quickly without excessive oxidation, decarburize it quickly at a high temperature in order not to fill the slag and steel full of iron oxide, and finally settle up the steel as quickly and thoroughly as possible, which implies holding it for a sufficient length of time in a furnace atmosphere as high as possible in temperature and as low as possible in its oxidizing effect. After this is done, the furnace may be cooled down sufficiently to bring the steel to the proper pouring temperature.

The best, and as a rule, the most economical fuel to use, is producer gas, provided a good quality of gas coal is used. The precaution should be taken to inject into the producers the least amount of steam necessary to prevent the formation of clinkers, as the greater the amount of steam used, the higher will be the content of hydrogen in the gas and, therefore, the more oxidizing.

As the quality and tonnage of steel produced are functions of the degree of temperature, rather than of the number of heat units, it follows that the temperature of the pre-heated gas and air should be as high as possible. If there is any difference in temperature between the two, it should be in favor of the gas, as this flows closer to the bath and the air closer to the roof. This highly pre-heated gas should enter the combustion chamber in a thin stream at a high velocity, for the reason that the thinner the stream, the quicker will be the combustion, and the nearer its velocity to the critical velocity of the gas, the greater will be its efficiency in heat transfer.

The direction of the stream should be such as not to have the flame impinge on the slag, yet flowing fairly close to it, so that one just barely can see across the furnace between the flame and the slag. This will prevent the highly oxidizing products of the combustion, CO_2 and H_2O from coming in direct contact with the slag and with the small particles of steel thrown up above the slag by the carbon-boil, which would cause an over-oxidation of the slag and steel. It will also prevent the immediate sweeping away of the more or less non-oxidizing state of the atmosphere close to the bath, caused by the constant evolution of carbon monoxide from the bursting bubbles on the surface of the slag.

The pre-heated air, on the other hand, should enter the combustion chamber at a low velocity, as the greater the difference in velocity between the gas and air, the more rapidly will the combustion take place.

In order to have a sharp flame before it reaches the hearth proper, there should be ample space between the face of the gas port and the hearth to serve as a preliminary combustion space. In large furnaces the length of that space should not be less than from 8 to 10 ft. at each end. The combustion should take place under a slight outward pressure, just enough to produce a flicker of flame above the charging doors. This will prevent cold air from being drawn into the furnace, which would lower the temperature and make the furnace atmosphere more oxidizing. The roof of the combustion chamber should be high enough over the bath to permit a full and free development of the flame, without the roof getting damaged by direct contact with the flame or the highly heated products thereof.

Carbon in the Steel and the Temperature.—In regard to the second of the four conditions that determine the oxidizing quality of the slag, viz., the amount of carbon in the steel and its temperature, the greatest care must be taken to have the bath hot while oreing down, as this is an endothermic reaction also not to add too much ore at a time, which would lower the temperature and fill the slag and steel full of iron oxide, and to stop the addition of ore well before the carbon aimed at has been reached in order to give the carbon in the steel the time and the high temperature required to deoxidize the steel, as well as the slag, and bring the two into equilibrium.

The Basicity of the Slag.—In regard to the third and fourth conditions, the more basic the slag is made during the settling-up period, provided it is also kept quite fluid, the more deoxidizing will it be and the cleaner the steel produced. Burnt lime should therefore be added during this time to increase its basicity, and at the same time the temperature of the bath raised to enable the slag to dissolve this lime and yet keep its proper fluidity. After sufficient time has been allowed for this settling-up process, and preparatory to tapping the furnace, the pre-heated air should be shut off so as to run the furnace with a very soft flame and cool the bath down to the proper pouring temperature.

It is hardly necessary to add that in order to obtain good results as far as the quality of the steel is concerned, there should be at all times a close cooperation between the melting shop and the chemical laboratory.

Secretary Mellon's Comment on the Abolishing of 12-Hour Day

WASHINGTON, Jan. 29.—In an informal statement last Thursday, Secretary of the Treasury Mellon agreed with the statement made by Chairman Gary of the United States Steel Corporation on last Tuesday to President Coolidge that costs of production of iron and steel had been increased 10 per cent as a result of the elimination of the 12-hr. day. The Secretary of the Treasury expressed the belief that any increased prices would be moderate and stated that he did not look for a horizontal advance in prices. The only thing that would bring such an increase, in the opinion of Mr. Mellon, would be a great shortage of labor and he pointed out that he did not expect such a development. The Secretary commented on the fact that the 8-hr. day has developed improved labor and mechanical efficiency and said that further improvement in this direction might be looked for and that in such an instance it would tend to prevent the necessity of increasing steel prices.

STEEL CORPORATION EARNINGS

Extra Dividend Declared for Second Time in the Year

Large Appropriation for Additions—Increased Cost Due to Abolishing 12-Hour Day Offset in Part by Greater Operations

The report of the United States Steel Corporation for the fourth quarter of 1923 was made public Tuesday afternoon with the announcement of a declaration of an extra dividend of ½ of 1 per cent on the common stock. The showing for the fourth quarter was a favorable one, the net earnings being $49,958,980, compared with $47,053,680 for the third quarter. The earnings for the year were $179,650,010, compared with $101,647,671 for 1922. The surplus for the year was $14,282,390. The statement indicated that the best month of the last quarter was October, with earnings of $18,600,897, and December the poorest, with earnings of $14,072,232. The extra dividend for the third quarter was ¼ of 1 per cent. Earnings for 1923 and the three preceding years were as follows:

Quarters	1923	1922	1921	1920
First.....	$34,780,069	$19,339,985	$32,286,722	$42,089,019
Second....	47,858,181	27,286,945	21,892,016	43,155,705
Third.....	47,053,680	27,468,339	18,918,058	48,051,540
Fourth...	49,958,980	27,552,392	19,612,033	43,877,862
Net earnings each year	$179,650,910	$101,647,671	$92,708,827	$177,174,126

Judge Gary received representatives of the press after the statement of earnings was made and was asked whether the abolishing of the 12-hr. day was responsible for the decrease in earnings in November and December. In reply he said that it was estimated that the abolishing of the 12-hr. day would cause an annual increase of about 10 per cent in costs of production and that would amount to about $25,000,000 for a year. That increase in cost had not applied to all of the last quarter and, in fact, the full effect had not been felt until late in the quarter. He added that to some extent the increased cost, due to the shorter day, has been offset, "for every manufacturer knows that full operation is more economical than partial operation." He remarked that the decrease in December was to a considerable extent natural for that time of the year.

Referring to general business conditions and the policy of the Steel Corporation, Judge Gary said that in compliance with its policy toward employees and stockholders it was believed that justice required a declaration of an extra dividend of ½ of 1 per cent. He expressed the belief that business of the country would be all right if allowed to pursue its natural and proper course without unjustifiable interference. He declared that the present administration of governmental affairs at Washington is "wise, discreet, dignified and constructive."

Earnings for Fourth Quarter

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
October, 1923.....	$19,290,798	$690,601	$18,600,197
November, 1923...	17,976,158	689,607	17,286,551
December, 1923...	14,761,036	688,804	14,072,232
	$52,027,992	$2,069,012	
Net earnings			$49,958,980
Less charges and allowances for depreciation, extraordinary replacement and sinking funds on bonds			13,041,684
Net income			$36,917,296
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,645,546	
Premium on bonds redeemed		167,577	4,813,123
Balance			$32,104,173
Add, net balance of sundry receipts and charges, including adjustments of various accounts...			235,189
Total			$32,339,362
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent		$6,304,920	
Common, 1¼ per cent		6,353,782	12,658,702
Balance			$19,680,660
Balance of surplus for nine months ending Sept. 30, 1923			17,143,242
			$36,823,902
Less: Extra dividend, common, ½ of 1 per cent		$2,541,512	
Sums appropriated and expended, or to be expended, account of additions, improvements or betterments to plants and properties		20,000,000	22,541,512
Balance of surplus for year			$14,282,390

New Construction Plans of the United States Steel Corporation

In answer to an inquiry from newspaper representatives in regard to a report that the United States Steel Corporation has formulated a big improvement program for various subsidiaries, Judge Gary on Jan. 24 said:

We are all the time making extensions and improvements at one or another of our various plants. Some are more important than others. Our annual reports which have been published regularly will give full information concerning these matters. It is not a new departure to recommend expenditures that are large. If we did not make them we could not maintain our proper place in the iron and steel trade.

Just at present we are contemplating the rearrangement and improvement of some of the mills of the Homestead Works at Pittsburgh, and have appropriated $6,000,000 on account of the same. How much the total will be we are not prepared to say now and will not be for some time.

We are also proposing to complete the tube plant at Gary, Ind., which has been in process of construction for over a year. We have likewise lately recommended $6,000,000 on account of this work.

Also, we have recommended the construction of an additional unit of 140 by-product coke ovens at Gary, Ind., to meet the full requirements of the large number of blast furnaces at Gary and South Chicago, which have heretofore been built and have been in operation for some years. For these ovens we have appropriated over $3,000,000.

These, of course, do not include all the work that is being done or is contemplated, but they are the leading items. We do not give to the press daily or regularly, except by annual reports, a full statement of our expenditures. If we did, we would devote considerable time in doing so. Occasionally, when it seems important, we try to accommodate the newspaper inquirer and hence I am making this statement.

The plan to rebuild the Homestead Works was announced in THE IRON AGE Jan. 24, 1924, page 310. The building of the tube plant at Gary was referred to in the annual review number of THE IRON AGE Jan. 3, 1924, and at earlier dates.

The building of the additional 140 by-product coke ovens at Gary has not heretofore been announced.

Modernizing Homestead Works

PITTSBURGH, Jan. 29.—It is officially announced that the work of modernization at the Homestead Works of the Carnegie Steel Co. this year will be concentrated on the rebuilding of the structural mills. This confirms the intimation given in THE IRON AGE last week. As later announced by Judge Gary in New York, the appropriation for this work for this year is $6,000,000. The program of rehabilitation of the Homestead Works, it is understood, will take a period of three to four years and involve the expenditure of more than $20,000,000. It is stated that this year's work does not involve the rebuilding of any of the existing steel-making capacity.

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Easy Money and Construction Activity

EMPHASIS is being put in current financial reviews on the continuing ease of money as an indication that a satisfactory volume of business may be expected for some months. There are now no signs of an early tightening of the market for money, nor does industry show a tendency toward unhealthy expansion, to such use of credit as would result in a freezing of loans. For many months the Harvard Economic Service has based its predictions of a sustained volume of business largely on the fact that money is abundant and available at low rates. Repeatedly in 1923 it was pointed out that the important consideration during the prosperity phase of the business cycle is not the short time movement of commodity prices but rather the movement of interest rates. The New York Federal Reserve Bank, in its report for last week, showed cash reserves at $1,745,000,000 above legal requirements, an amount never before equaled. At the same time the ratio of cash on hand to loans was but little less than 8 to 1.

A monthly analysis of business conditions, published in New York, that has the distinction of having been right most of the time in the past year in its forecasts, has emphasized month after month the volume of new construction as an index to the general state of business in the country. So many industries contribute to the requirements of construction work, especially to the erection of new buildings, that when it is active there is widely diffused activity. Just now the outlook for construction is as good as it was at this time last year and, if the business in structural steel is any criterion, 1924 will compare favorably with its predecessor. Political factors may assert themselves later to the detriment of business, and it is conceivable that conditions in Europe may have a more unfavorable effect on American industry than they had in 1923—though the contrary seems now more probable; and it is fully recognized that there is a point at which the high cost of building will have a greater effect in limiting demand than it has had thus far. There is also the possibility that influences traceable to the war and that are now latent will come to the surface later and give a check to prosperity. The fact remains, however, that while developments since the opening of the year have not given definite testimony one way or the other, the situation today, measured by the supply and ease of money and by the activity in new construction, gives fair promise of business in good volume for most if not all of the first half year.

Price Concessions on Quantity

IN steel as in other commodities the large buyer is disposed to feel that he is entitled to a quantity differential or price concession. Sellers have also recognized the point; but the trend in steel in recent years has been toward the reduction of such differentials or concessions.

No change in the theory underlying such transactions is involved in the change in practice. There is simply a better understanding of the circumstances and a more practical and direct application of theory. The theory is that if it costs less to sell and deliver in large quantities than in small quantities a discount should be given to the large buyer. The change in attitude of steel mills is due to their having acquired a broader conception of the matter of cost. An element that used to be given little attention is now given much attention—the point that when a large consumer is taken on as a customer, a correspondingly large gap is left if the customer is lost. If the customer is taken on when orders are easy to get and is lost when orders are hard to get, the expense of the transaction is large. To make room for the large customer some very good small customers may have to be dropped, and it is difficult to get them back in a weak or oversupplied market.

The value of patronage lies more in its continuity than in its mere size. Ten customers taking 1000 tons each in good years and 700 tons each in poor years are better than one customer taking 10,000 tons in good years and only 5000 tons in poor years. Moreover, in poor years the large buyer has more assurance, in seeking a concession as the price of continued patronage, than the small buyer.

In recent years service has come to the top in steel. While large orders, with long runs in given

sizes, are advantageous to the steel mill, service is important to the buyer, and the larger the buyer the more difficult it is for the mill to render desired service. Service is worth money, and the larger the service the more it is worth. If the small buyer finds his deliveries insufficient he can go out and buy in the prompt market, or from jobbers. The large consumer is too large for such markets. Accordingly, when the large buyer of steel asks for a concession on his order the mill is likely to reply that he gets his concession not in price, but in service.

A special case is presented when the steel mill is offered a large tonnage, not for a quarter, a half year, or a year, but for a term of years. Then the whole system of doing business can be modified. A smaller sales force is needed, and by the close contact between seller and buyer that naturally arises the mill can arrange its affairs to render better service to such a customer, and get along better itself, than when dealing with customers whose relations are temporary.

Economies in Fabricated Steel

NO less than $10,000,000 a year saving in riveting cost in steel building construction appears possible to Chief Engineer L. H. Miller of the American Institute of Steel Construction. For a year of capacity operations he would put the total saving in material as close to $30,000,000. This is based largely on economies in design, such as his association is striving to establish. A full capacity year means 3,000,000 tons of fabricated steel work, and the saving mentioned is equivalent to 10 per cent of the total, figuring the erected cost at $100 per ton.

The principal opportunity for waste reduction lies in locating, punching, assembling, heating and driving rivets. The cost of these items when charged against rivets makes each rivet cost between 15 and 20 cents. In 3,000,000 tons of fabricated steel, there are 100,000 tons of rivets. At one-half pound each, there are thus 400 million rivets. At 15 cents apiece, they cost $60,000,000. The $10,000,000 saving is accordingly one-sixth of the present cost.

To secure for the building industry these sizable reductions, the association has embarked on a program of engineering education within and without the industry. Certainly competition has not effected the kind of economies wanted; if anything it has done the reverse, when one considers the varying building regulations it has helped to set up in different communities. The call is for concerted action for the general good, as an individual can hardly bring uniformity and rationality in building requirements the country over and no one has been able as yet to secure agreement in the economical design and use of material.

IN recent hearings of the Federal Trade Commission on the Bethlehem-Midvale merger, many of the consumers put on the stand as witnesses have stated that prices of steel are not so much of a factor as delivery. This would seem to be borne out, in part at least, by the experience of some of the European steel mills in trying to sell in this country. Although prices are frequently being quoted on European plates, shapes and bars that would permit delivery at points on the Atlantic seaboard several dollars a ton lower than delivered prices quoted by American mills, including, of course, the Pittsburgh freight rate, comparatively little business has resulted. The explanation of steel importers here is that European mills will not guarantee delivery, and without such guarantee even the low European prices are of little interest. The situation is well illustrated in recent cable correspondence between a Belgian mill and an American importer regarding a few hundred tons of steel bars. The order would have gone to the Belgian mill had it been willing to guarantee delivery at a specified time; but this it would not do, and the prospective buyer would not contract with the delivery indefinite. Even companies which have attempted to import European steel to put in warehouse here for resale in jobbing lots have been dissatisfied with the outcome because of the uncertainty of delivery from the other side.

What Is the Value of Our Railroads?

ABOUT the middle of 1920 the Interstate Commerce Commission published a finding that, for the purpose of a particular case, the value of the steam railroad property subject to the Interstate Commerce Commission act should be taken as approximating $18,900,000,000. At the same time it said that the aggregate amount carried as book cost of road and equipment by all classes of carriers, as of Dec. 31, 1919, was $20,040,000,000. Since that time nearly two billions of new capital has been put into them. F. L. Loree, president of the Delaware & Hudson Co., in a contribution to an economic book in the latter part of 1921, estimated the value of the railroads of the United States at 24.5 billion dollars as of the end of 1916 and at 25.5 billion dollars as of the end of 1920.

Senator LaFollette, a good many years ago, entertaining the opinion (or professing to do so) that the railroads of the United States were exacting rates correlated with an excessive valuation, secured the enactment of legislation for a physical valuation in detail by the Interstate Commerce Commission. Publication of its results has not been completed, but its valuations as announced for a number of roads would indicate that the total is going to be in excess of the tentative estimate of 1920. Even so, many of these new valuations are being contested by the railroads in question on the ground of inadequacy.

In spite of all this evidence the group of politicians that is variously described as progressive, radical or nonsensical, maintains that the actual value of the railroads of the United States is only about $12,000,000,000. Senator Brookhart has been represented as proposing to introduce a bill "providing for reduction of capitalization to a figure not exceeding the market value of the stocks and bonds, and abolition of capitalization of unearned increment," which bill, if enacted, he

says, "will squeeze more than $7,000,000,000 of watered stock out of the railroads." Evidently his starting point is the 18.9 billion dollar tentative valuation of 1920, followed by the assumption that about seven billion thereof is only nominal.

In a recent address Mr. Loree showed that about $7,600,000,000 of new capital had been put into the railroads between the middle of 1907 and the end of 1922, and about $5,500,000,000 between 1912 and 1922. Notwithstanding these additions of new money the aggregate market value of stocks and bonds of the carriers, as indicated by market quotations, which was upward of $15,000,000,000 in 1912, declined to approximately $13,000,000,000 in 1922.

More recently we have had a valuation by the Committee on Public Relations of the Eastern Railroads, which is presented quantitatively, and therefore permits a visualization better than the citation of aggregate value in terms of dollars alone. The committee estimates as follows:

400,000 miles of track at $25,000	$10,000,000,000
69,000 locomotives at $20,000	1,380,000,000
2,400,000 freight cars at $1,000	2,400,000,000
57,000 passenger cars at $10,000	570,000,000
Materials	500,000,000
Working capital	500,000,000
50,000 stations, terminals, shops, yards, etc.	7,000,000,000
Total	$22,350,000,000

The above estimate is based on pre-war costs. If this railroad property had to be replaced at $36,000 per mile of track, $60,000 per locomotive, $2,500 per freight car and $30,000 per passenger car, etc., which are substantially current costs, the total would come to about $37,250,000,000.

The estimates of the Interstate Commerce Commission, the Committee of Eastern Railroads, independent experts and others, ranging from 21 to 25 billion dollars, with all indications that the higher is the better figure, all of these estimates based on pre-war values, are as close as such bold estimates can be expected to be. Their substantial coincidence is impressive. The quantitative analysis by the Committee of the Eastern Railroads shows clearly that there is no water in the valuations; not even any allowance for the value of experience and organization, which in all business affairs is a real and potent thing. Senators LaFollette, Brookhart and the rest of them will have to seek a different ground for their contention that the value of all the railroads of this country is only about $12,000,000,000.

There are several ways of reckoning the value of capital goods, under which head are railroads, but there is one great general principle, viz., that present value is a capitalization of prospective earning capacity, with allowance for reimbursement of the principal if it be a wasting asset like a mine, for obsolescence if it be a deteriorating asset like a factory, and for something more than mere upkeep even in the instance of a railroad. First cost and replacement cost are not necessarily determinative factors in any way. Replacement cost might enter into consideration in a commercial valuation for purchase or sale, or it might be disregarded entirely. First cost might be partly extinguished by a change in economic conditions, requiring that more or less of it be charged off as loss. On the other hand, a favorable change in economic conditions might produce a valuation in excess of first cost, which would be a justification for writing up. These are substantially the conditions when there is an absence of artificial restrictions and a free play of economic law.

Quotations in the stock market represent the buying and selling of floating supplies. Computation of a total of 12 or 13 billion dollars for all the railroads of the country, on the basis of quotations in the stock market, does not imply that they could be bought or be sold for such sums. Efforts to buy controlling interests usually lead to advancing quotations, and *vice versa* efforts to liquidate exhibit themselves oppositely. If everybody tried to sell securities at about the same time the consequence would be such a debacle as happened at the outbreak of the Great War. Concentrated buying for acquisition of control may result in something like the Northern Pacific corner of an earlier date.

However, the relatively low quotations for railroad securities, recently and at present, reflect indeed a low estimate of the prospective earning capacities of the properties they represent. A reason therefor is the restrictive legislation that has been imposed upon the railroads. We see therein a modification of the general principle of value being a capitalization of prospective earnings.

If prospective earnings be limited by the State, for which there is ground in that corporations enjoy franchises of the State and perhaps thereby a monopoly of service, it would be within the vision of legislators to try to curtail earnings so as to confiscate capital. It is clearly something of that sort that Senators LaFollette, Brookhart and their associates contemplate; but inasmuch as confiscation is at present unconstitutional, the courts step in and annul legislative enactments of such nature. There must then be introduced a method of valuation that is different from the natural and economic. If in conditions of free competition value is a function of prospective earning capacity, the fixing of earning capacity implies the need for a fixing of value. In other words, where competitive conditions produce fluctuating capital values, the imposition of a maximum permissible rate of earning necessitates the naming of a fixed capitalization to which that rate shall apply.

There has been already much litigation under this head in connection with public service corporations. In such cases that have been decided by the courts, so far, including the Supreme Court, several bases have been decreed, none of them favorable to the aspirations of Senators La Follette, Brookhart, et al. One of these has been the basis of capital actually invested. Another has been the basis of replacement value. By the former of these methods the railroads should be allowed to enjoy a fair return on something like $22,000,000,000; by the other method a fair return on perhaps $37,000,000,000. The latter is far more than that for which the railroad companies make any claim. Yet we see all around us the rents for pre-war buildings being raised to the basis established by the cost of new buildings,

thus reflecting the operation of the law of supply and demand.

The baiting of the railroads, which are the property of nearly 800,000 stockholders, in the interest of persons who would like to have lower rates simply because they wish it, is one of the evil manifestations of the day. The index of freight rates, taking the average of 1913-15 as the base, attained a maximum of only 174 in 1921, while in 1922 it was only 161. At the present time it is probably lower than the composite for all industry in the United States, which may be something like 175. This is one of the reasons why the market price for railroad securities is so low. Another is the fact that the index for railroad labor is about 216. The index of prices for farm products ran far ahead of that for freight rates in every year from 1913 to 1921. That since then it has been deplorably low is no fault of the railroads.

Cheap Production the Answer

WITH increasing capacity competition in automobile production grows sharper every year. The margin between cost and selling price is narrowing and car builders are constantly trying to cut down production costs by installing better machinery for rapid quantity production, getting improved handling equipment, and increasing plant efficiency in other directions. Some important companies still depend on other manufacturers to supply many of their parts, such as cylinder blocks and other castings, forgings, stampings and gears; but the tendency among the larger builders is to concentrate the manufacture of parts in their own plants. Many metal working plants, particularly in the Central West, either sprang up to supply the automobile trade or have expanded greatly because of the demands from that field. In not a few cases these plants have been equipped especially for large production work in automobile parts and some have fitted up units for the manufacture of a certain part for one type of car.

The automobile companies are close buyers, but their orders are attractive because of the volume. Whether outside manufacturers will retain the bulk of this business that they now have depends largely upon maintaining high efficiency in their plants. In the case of most manufactured products of a competitive character the manufacturer's success depends mainly on whether his management and his manufacturing methods are such that he can produce as cheaply as his competitor or more so. In the making of automobile parts this cost-cutting competition is between the car builders on the one hand and the metal working shops, including foundries, that serve the automotive trade. It is a case of the survival of the fittest in manufacturing processes. While car builders have made a remarkable advance in mass production methods, many manufacturers of automobile parts have been equally progressive.

A manufacturer whose large plant works almost entirely on automobile parts, being fitted with a great deal of highly specialized equipment, was asked recently if he did not fear that his customers would add manufacturing units and make these parts themselves. He replied: "As long as we can turn out our work more cheaply than the automobile companies can, we will get their business. If they can succeed in doing it more cheaply than we can, we will lose their business."

Naturally, among reasons that deter the automobile manufacturer who thinks of becoming self-contained are the large investment involved, the new organization and manufacturing problems (as in building and operating a foundry), the new classes of labor, and the risks of dependence on a single locality, as contrasted with ability to draw on many sources of supply. But most of these factors really resolve themselves into considerations of cost.

Alloy Gives New Life to the Cable

NEW alloys are constantly appearing, but time is generally required for their development commercially. An illustration is the recent application of "Permalloy." This 80 per cent nickel and 20 per cent iron combination was discovered some time ago, but certain difficulties in its manufacture had to be overcome. Its remarkable magnetic properties were recognized early and it is now announced that by incorporating it as very

The Iron Age and Its Readers

SOME of the questions put to THE IRON AGE contain unintended humor. A recent one asked us for the total amount of the surface of steel in the United States requiring painting. Clearly some sales investigator was asked to determine the latent possibilities of the market for some rust inhibiting covering. All that we were expected to do, possibly, was to take the information from the proper pigeon hole, and yet behind the inquiry was the belief that somehow we could give suggestions of value leading to an estimate that would be more than an irrational guess. On that account we gave the request no little consideration.

One institution not long ago had the temerity to evaluate the annual loss by rust of iron and steel for the whole world. The guess was better doubtless than none at all. And last week, in connection with a chart that fairly may be called startling, we printed corrosion figures coming from Europe indicating that the world is suffering the return to the earth's crust of iron in oxide form at the rate of no less than 21,000,000 tons annually, a corrosion loss that is huge measured by any standard we choose, even taking this country's annual output of pig iron.

Not to be outdone, THE IRON AGE met the challenge of the paint maker, and in a detailed estimate indicated that there are now over 65 billion square feet of steel surface requiring painting; that 20 billion square feet is expected to get, and does get, the painting only once, while the remainder is subject to periodic repainting.

The incident illustrates the wide range of latter-day industrial "research" between the conjectural and authoritative zones in the great field of statistics.

thin sheets or strips in the manufacture of the outer surface of submarine cables, it is possible to transmit messages under the sea at speeds many times those heretofore obtainable. In other words, "the old cable has been given new wind in the race with its young rival, the wireless, in service to mankind." Foremost in this achievement, however, have been heat treatment and the high temperature electric furnace. The two together have perfected this alloy and made possible the important use referred to, as well as others. The development may well be regarded as pointing to possibilities in the case of other alloys that at present have but limited industrial use.

CORRESPONDENCE

Box for Holding Left-Over Rod Ends

To the Editor: Storemen are generally aware of the necessity for keeping left-over ends of sawed rods in a neat and orderly manner, but apparently few of them make a continued effort to do so. Lack of suitable means for holding such odd-length material is probably the main cause of this, but in many plants no one is made responsible and consequently every short unwanted piece that drops from the hacksaw is thrown onto a heap of similar pieces. Then when a short piece is needed there is a hurried scramble over the pile.

A metal box arrangement that was found helpful in this connection is shown in the illustration. A piece of sheet iron is bent to fit the box inside and the sides drilled for two rods. Medium length rods are placed in the box with the ends resting on the top cross rail, and shorter lengths on the other side resting on the bottom rail, as shown. In this way all the rods of whatever length are in full view and the one required can be selected easily and removed without disturbing the rest.

HARRY MOORE.
Rosemount, Montreal, Canada.

Heavy Section French Rails

To the Editor: On reading your export market review in the issue of Nov. 22 we are astonished to find on page 1411 that the heavier open-hearth rail sections, such as those of 60 lb., are difficult to obtain in Europe.

Of course such rails in Europe are generally made of Bessemer steel but this steel is certainly as good as the open-hearth steel made in America and conditions laid down by the railroad companies here are more severe than those in America, with the result that we have less rails breaking than in America.

We are sending you our protest against discriminating between Bessemer and open-hearth rails, so that the readers of THE IRON AGE may not believe that Europe cannot make good rails. Rails as heavy as 100 to 110 lb. are not difficult to obtain in Europe. They are common sections. They meet tensile tests by which rails must give good elongation and meet very severe shock trials.

ASSOCIATION MINIÈRE D'ALSACE ET DE LORRAINE.
Metz, France, Jan. 9.

The New Heat Treatment for Gray Cast Iron

To the Editor: The article in THE IRON AGE of Jan. 3, 1924, under the caption "Tying Gray or White Cast Iron in Knots," by Bradley Stoughton, is indeed misleading. The impression is conveyed that cupola metal can be subjected to a suitable treatment and ductility developed. The world moves on so rapidly that it is with reluctance that the undersigned disputes the claim.

Notwithstanding, the article would be more complete if the process of manufacture were incorporated in the manuscript. So-called cast iron made in an air furnace has properties distinctly different from those of a cupola product, even though the analysis may be identical. Hence the misleading nature of the monograph.

When a reader sees the term "gray iron," a cupola product immediately comes to mind. If these properties can be developed with cupola gray iron, then a remarkable and distinct step has been made in the science of metallurgy. More information should be forthcoming.

V. E. HILLMAN,
Director of Research, Compton & Knowles Loom Works.
Worcester, Mass., Jan. 28.

Steel Treaters' Convention and Exposition in Boston, Sept. 22 to 26

The sixth annual convention and international steel exposition of the American Society of Steel Treating will be held in Boston Sept. 22 to 26 inclusive. The decision was reached at the meeting of the board of directors in Washington, Nov. 2, but definite announcement has been withheld due to the fact that some difficulty was experienced in securing in Boston a place with adequate facilities for holding the exposition.

Through the courtesy of Governor Channing H. Cox and Chairman William F. Williams, of the division of highways and waterways, permission has been granted the society to use the commonwealth pier for the exposition. This pier is ideally located and has adequate facilities for an exhibition. All of the spaces will be on one floor, as can be judged from the dimensions, which are 180 ft. by 1200 ft. Floor plans have been drawn up and forwarded to the exhibitors who were represented last year in Pittsburgh.

The program committee, under the direction of L. D. Hawkridge, held a meeting in New York in December and laid plans for convention papers and it is confidently expected that these will be of high caliber. The New England chapters have all pledged their hearty support to Mr. Handy, chairman of the Boston chapter, to assist in making the 1924 convention not only of great local interest but of interest to all the New England States.

Southern Foundrymen to Meet

The seventh annual convention of the Southern Metals Trades Association will be held at the St. Charles Hotel, New Orleans, La., Feb. 26 and 27. Among the speakers will be E. S. Jouett, vice-president and counsel of the Louisville & Nashville Railroad Co. on "Tinkering with the Transportation Act"; Enrique Touceda, consulting engineer, on "Miscellaneous Details in Connection with Gray Iron Foundry Practice"; Thomas Perkins, Macon, Ga., on "Foundry Costs"; W. C. Trout, Lufkin, Tex., on "Problems of Management in a Jobbing and Manufacturing Plant"; H. M. Lane, consulting engineer, on "A Comparison of American and European Foundry Practice." The banquet will be addressed by N. M. Leach, president Pacific-Caribbean Gulf Line, whose address will be "The Port of New Orleans."

The Collingwood Shipbuilding Co., Collingwood, Ont., has received a contract from the Matthews Steamship Co. for the construction of a lake freighter of the largest type that plies the Great Lakes.

Iron and Steel Markets in Europe

Marking Time in England and Lower Prices in Germany —Exchange Situation Leads to Cross Currents in Competition

(*By Cable*)

LONDON, ENGLAND, Jan. 29.

WITH the railroad strike settled, immediate resumption of operations is expected. In the meantime the iron and steel markets are marking time.

Continental pig iron still is being offered at competitive rates, but domestic makers are unwilling further to reduce their prices, owing to the fuel situation.

Hematite is unchanged, but the tendency is easier for substantial sales. Foreign ore is quiet, but there is some inquiry for second quarter shipments. Sellers of Bilbao Rubio ask 24s. ($5.11) c.i.f. Tees.

Finished iron and steel are quiet as regards fresh business but there is some fair inquiry on Continental account. Other overseas demand is poor. The plants are busy on domestic orders placed recently, comprising mainly railroad materials and equipment.

Sir William Arrol & Co., Ltd., Glasgow, has been awarded a contract at £554,000 ($2,360,000) for the extension to the Avonmouth dock at Bristol.

Continental position is very complicated. Few overseas buyers are willing to commit themselves and the works are not keen sellers. Prices generally are unaltered, but some merchant sales at low prices have been recorded on favorable exchange position.

Tin plate is displaying moderately increased activity, but has no special feature. Export buying is quiet; domestic, fairly brisk. Germany is reported to be buying French tin plate at prices competing favorably with Wales.

Galvanized sheets are dull. The output has been curtailed by the railroad strike, but is expected to be renewed almost immediately.

Black sheets are quiet, with an easier tendency.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.26 per £1, as follows:

Durham coke, delivered	£1	16½s.	to £1	17s.	$7.77 to	$7.88
Bilbao Rubio ore†	1	4			5.11	
Cleveland No. 1 foundry	5	1			21.51	
Cleveland No. 3 foundry	4	19½			21.19	
Cleveland No. 4 foundry	4	16			20.45	
Cleveland No. 4 forge	4	15			20.23	
Cleveland basic	4	17½			20.77	
East Coast mixed	5	2½			21.83	
East Coast hematite	4	19	to 5	0	21.09 to	21.30
Ferromanganese	17	0			72.42	
Rails, 60 lb. and up	9	0	to 10	0	38.34 to	42.60
Billets	8	0	to 8	10	34.08 to	36.21
Sheet and tin plate bars, Welsh	8	18¾			38.08	
Tin plates, base box	1	3¾	to 1	4¼	5.06 to	5.16
					C. per Lb.	
Ship plates	9	15	to 10	5	1.85 to	1.93
Boiler plates	13	0	to 13	10	2.47 to	2.57
Tees	10	0	to 10	10	1.90 to	1.96
Channels	9	5	to 9	15	1.76 to	1.85
Beams	9	0	to 9	10	1.71 to	1.81
Round bars, ¾ to 3 in.	10	10	to 11	0	1.96 to	2.09
Galvanized sheets, 24 g.	18	7½	to 18	10	3.49 to	3.52
Black sheets, 24 gage	13	15	to 14	0	2.61 to	2.66
Black sheets, Japanese specifications	15	5			2.90	
Steel hoops	12	10	& 12	15*	2.38 &	2.42*
Cold rolled steel strip, 20 gage	17	12½			3.35	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(*Nominal*)

Foundry pig iron:					
Belgium	£4	2½s.		$17.57	
France	4	2½		17.57	
Luxemburg	4	2½		17.57	
Billets (nominal):					
Belgium	5	10		23.43	
France	5	10		23.43	
Merchant bars:					C. per Lb.
Belgium	£6	10s.			1.24
Luxemburg	6	10			1.24
France	6	10			1.24
Joists (beams):					
Belgium	6	5			1.19
Luxemburg	6	5			1.19
France	6	5			1.19
Angles:					
Belgium	8	0	to £8	5s.	1.52 to 1.57
⅛-in. plates:					
Belgium	7	12½			1.45
Germany	7	12½			1.45
¾-in. plates:					
Luxemburg	7	12½			1.45
Belgium	7	12½			1.45

GERMAN STEEL PRICES LOWER

Both Bars and Thin Sheets Marked Down—They Are Well Below British and American Figures

(*By Radiogram*)

BERLIN, GERMANY, Jan. 28.—Steel bars are now quoted at 130 gold marks per metric ton (1.40c. per lb.) and thin steel sheets at 185 gold marks (2c. per lb.).

This makes a reduction from prices quoted two weeks ago (page 232, THE IRON AGE, Jan. 17) when bars were 150m. (1.62c.) and sheets 225m. (2.43c.). Two weeks before that—Dec. 31—bars were 145m. (1.57c.). The pre-war (1913) price was 98m. (1.06c. per lb.).

[Comparison with American markets shows bars at 2.40c. and sheets at 3.85c., both at Pittsburgh. In the British market, bars are 1.98 to 2.07c. and sheets 2.64c. per lb.]

GERMAN WORKS REDUCE PAY

Longer Day Introduced—Prices Almost at Pre-War Level—Austria and Czecho-Slovakia Agree on Prices

BERLIN, GERMANY, Jan. 11.—Increase in the regular 8-hr. day to nine or ten hours has caused considerable trouble especially in the engineering industry. The metal-workers' strike in the Berlin district has been settled, but there are still strikes in the western engineering works. The Berlin strike has resulted in the introduction of the 9-hr. day wherever necessary. Ten hours may be worked if the shop-committee agrees. Overtime payment is made for more than 10 hours work. Wages to workers paid by the hour is from 38 to 48 pfennig, 9c. to 11½c. per hour. Those on piece work average about 30 per cent more, up to about 16c.

In several districts employees have been locked out in order to force a settlement on hours and rate of pay. These differences between employers and employees are influencing business adversely and the increased inquiries and orders which promised greater activity in industry, have decreased lately. Uncertainty of delivery and strong competition have induced many customers to await further developments before making large contracts.

The German Upper Silesian iron works have entered into an agreement with the trade unions for an increase in working hours to the pre-war basis and a 10-hr. day will be introduced generally except in the works which, before or during the war, worked fewer hours. The industry is not fully employed.

Production of some products has been increased con-

siderably compared with 1922 but reduced sales are at present hampering further advancements in this direction. Export trade is not satisfactory, partly as a result of diminished purchasing by Balkan markets which began last fall. Stocks at works have consequently increased, especially in rolled material, including beams, rails, girders, etc., which has been sold in considerable quantities to the near East.

Strong Czecho-Slovakian and British competition have reduced the sales of the Upper Silesian works to northern countries, which have been one of their principal markets. Manufacturers of specialties, however, are operating at a high percentage, some having attained pre-war production.

Most of the blast furnaces are operating and some engineering works are building extensions to their plants. The Upper Silesian industry is handicapped by the long distance from other German manufacturing districts, and shipment through Germany is almost impossible with the high freight rates. The sheet mills find it difficult to compete for business, even in central Germany and special freight rates for Upper Silesian industry are strongly advocated. Other German iron and steel associations are also petitioning the railroad and shipping authorities for lower rates that they may be in a better position to compete successfully abroad.

The railroads have made an 8 per cent reduction of freight rates effective Jan. 20, and further concessions have been made on shipments destined for export from German harbors. Although the financial position of the railroads is not strong, rates have been lowered as a further aid to price reductions generally. This policy will influence coal and iron prices which already show a strong tendency to decline. The present price movement is expected to reduce prices sufficiently to permit Germany industry to appear again as a more formidable competitor in the world's markets.

General Price Reductions

The Pig Iron Association has made considerable reductions. Hematite is quoted at 105 gold marks ($25.); foundry iron No. 1, 92 gold marks ($22.); foundry iron No. 3, 90 gold marks ($21.50); steel making iron at 105 gold marks ($25) and spiegeleisen according to manganese content at 120 to 140 gold marks ($28.50 to $33.25), f.o.b. Rhenish-Westphalian works or Siegen. For other parts of the country quotations are on a sliding scale fluctuating according to transportation cost and foreign competition. With the altered market conditions and in order to stimulate business the Pig Iron Association has granted longer terms for payment, deliveries during the first half of a month being paid for until the twenty-fifth and deliveries during the second half until the tenth of the following month.

Rolled material prices are also weakening. In addition to the lack of ready capital, there is heavy competition from French and Belgian industry that is depressing prices. German bids for contracts abroad have invariably been undercut and prices have been reached which would leave only a very small or no margin of profit. Another factor that is still adding to the uncertainty of the situation is the expected sale of the stocks in the Ruhr. Following the agreements with the occupation authorities, material confiscated at the works has been turned back to the manufacturers but traders stocks are being sold by the French authorities. Competition is keen especially in view of the resumption of full operation of Rhenish industry. Quotations for February delivery are 150 gold marks ($35.75) per ton for bar iron. The highest pre-war price was about 140 gold marks ($33.25) which at times of business depression sometimes declined to 100 ($23.75). Requirements are not large at present. The building trade is almost at a standstill and the iron trade is generally only buying small lots. Further price reductions are generally expected.

German prices are at about the level of world-market prices but lower than the eastern European quotations. Polish-Upper Silesian works, for instance, quote rolled material not below £9 10s and Czecho-Slovakian material is also too high in price to compete, even in the Berlin district. Generally demand is light but as the bulk of the requirements in rolled material has still to be supplied by the German works outside the occupied area, the Peiner Wąlzwerk, the Lauchhammer works (Linke-Hoffmann control) the Georgs Marienhütte, (Klöckner control) and a few others, these companies are consequently fairly busy. The Peiner Walzwerk is sold up for some time ahead. There is a scarcity of heavy sheets and manufacturers have reduced rebates. Demand for thin and medium sheets is small.

The Berg und Hüttenmännischer Verein Wetzlar (Iron Ore Association) has reduced the base prices for ore; red hematite above 36 per cent, on the basis of 42 per cent iron and 28 per cent silicon to 13.5 gold marks per ton; Upper Hessian (Vogelsberg) brown hematite is quoted at 13.5 gold marks on the basis of 41 per cent iron and 15 per cent silicon.

Scarcity of working capital is especially acute at works that have suffered through the occupation. Many of them are disposing of the shares of other industrial works they hold. The Krupp company is issuing $1,500,000 worth of 6 per cent gold loan bonds, repayable within 25 years from 1929. The bonds are a first mortgage on the entire landed property of the corporation including the Germania dockyard at Kiel-Garden.

Negotiations between the Czecho-Slovakian and the Austrian iron and steel works for an agreement on prices have been successful. The agreement excludes competition between the two and fixes the tonnages of material that may be exported by either country into the other. The agreement which it is intended to extend to joint competition abroad, constitutes also a certain safeguard against the Franco-German competition which is expected as a result of a closer association between the French and German industries.

FRENCH MARKET QUIET

Effort to Stabilize Franc—German Competition on Sheets—Exchange Makes Effort Difficult

PARIS, FRANCE, Jan. 11.—The French market has been quiet since the beginning of the year, under the influence of the heavy decline of the franc. After reaching the low value of 88.30 fr. to the pound sterling, the franc seems slightly improved and has been for the past three days between 87 and 88 fr. to the pound. The Government is adopting energetic measures to stop this depreciation, believed to be based on speculative maneuvers. It is hoped that these measures will not seriously affect business.

At export, offers of French sellers are favorably accepted, but as the rate of the pound sterling continues unstable, the securing of orders is rendered most difficult. British and American exporters generally offer little or no competition.

Iron and steel production is progressing, but with high costs of raw materials selling prices can hardly decline further without losses to producers.

Coke.—The Société des Cokes de Hauts-Fourneaux, during the first eight days of January (excluding shipments through Aix-La-Chapelle) has received a total supply of 70,608 tons of coke from the Ruhr, or a daily average of 8826 tons.

Pig Iron.—The pig iron output is increasing since the blowing in of more furnaces, principally in Lorraine. The larger part of this production is shipped for export and the rest is stocked. Keen competition is felt and is reacting on prices, which tend downward. An even greater decline would doubtless be registered were not prices sustained by the rate of sterling. Chill-cast foundry pig iron is quoted 380 fr. per metric ton, with concessions noted on large tonnages. It is noteworthy that on a ton of pig iron sold at 380 fr., coke enters into the cost for 275 fr., or 70 per cent of the selling price in contrast to a pre-war proportion of only 40 per cent of the selling price.

High phosphorus pig iron No. 3 has been quoted at 383.10 fr. per ton, the price fixed by the Founders Co-operative Association. For hematite, the average is about 450 fr., delivered, or 425 fr. at works. British grades are only sold for special purposes as prices are almost prohibitive; high grade West Coast hematite is

oted as high as 580 fr. and mixed numbers at 550 to 60 fr. per ton. Lorraine furnaces are asking, in Belgian currency f.o.b. Antwerp, 410 to 420 fr. for chill ast foundry pig iron and 400 fr. for basic.

Semi-Finished Material.—The semi-finished market hows little improvement, fluctuating from day to day. The following quotations per metric ton are export and domestic prices per 100 kg. (basic material):

	Fr. Domestic	Lorraine and Luxemburg, f.o.b. Antwerp, Fr.
Ingots	45 to 46	..
Blooms	47 to 48	50
Billets	49 to 50	51
Largets	51 to 52	52

Rolled Material.—Inquiries are fairly numerous but the volume of orders is small. Both domestic and export demand is light and plants are quoting low prices. Nominal quotations are unchanged at 55 to 56 fr. for beams and 57 to 59 fr. per 100 kg. for merchant steels, domestic delivery. Lorraine, Luxemburg and German plants are quoting for export 650 and 660 fr. (Belgian currency) for bars, and 610 to 620 fr. for beams, per metric ton, delivered Antwerp.

Sheets.—The market is active in heavy gages but very dull in light and medium sheets. Prices continue unchanged for domestic delivery but interesting export offers on heavy gages are being made by German plants. Lorraine mills quote f.o.b. Antwerp 725 fr. per ton for 5 mm. sheets, in basic Bessemer.

BELGIAN MARKET WEAK

Heavy Tonnage of Pig Iron Quoted on to Scotland —German and French Competition

ANTWERP, BELGIUM, Jan. 12.—Prices for pig iron, especially high phosphorus, have declined during the past few days much more than was expected. Nominal prices have been 420 to 425 fr. for Belgian foundry No. 3, with Lorraine and Luxemburg quoting 415 to 420 fr. for No. 3. In the meantime merchants freely quote consumers prices as low as 405 to 410 fr. Even at these low prices sizeable orders are withheld, buyers relying on still further reductions. This is not the opinion of the producers and it is doubtful that merchants will be disposed to go much lower.

Coke prices have been much higher since the dissolution of the coke syndicate, 215 fr. per metric ton, $9.30, being paid freely today in contrast to 192.50 fr., the prevailing price in December. Furnaces, however, anticipate a better market before long. In fact the strong competition that has existed between Luxemburg and Lorraine works seems to be slackening and low offers are scarce.

Neither Belgian nor Dutch inquiries are large at present but since the franc depreciation, foreign inquiries, generally for fairly large tonnages and especially from Scotland, are on the market. At the current level and with the lower value of the franc, prices are interesting to foreign buyers. Even as high a price as 425 fr., f.o.b. Antwerp, represents today only $18.40 or 85s. 6d per gross ton. This quotation represents $21.50 per ton c.i.f. New York, Philadelphia, or New Orleans for pig iron analyzing 2.50 to 3.00 per cent sil., 0.5 per cent mn., 1.50 to 2.00 per cent phos., and 0.05 per cent max. sul. The price on this grade would be about $23, c.i.f. Pacific ports.

If only a part of the inquiries from England and Scotland result in business, large tonnages will be booked at prices such as 91s. f.o.b. Grangemouth, Scotland, which is considerably less than the price of Scotch foundry and even under the price at which English Middlesbrough foundry pig iron can be supplied as this class of iron is still quoted at 100s., f.o.b. Middlesbrough. These lower Belgian prices are only for delivery within two months as producers are not inclined to commit themselves for long contracts. Special foundry with lower phosphorus contents, 1 per cent max., has not declined as greatly as the high phosphorus. The available supply is not so large and the price of 2.50 to 3.00 per cent sil. is still about 460 fr., f.o.b. Antwerp, or about $20, which brings the price delivered Atlantic port to about $23, or $24.30 to $24.50 c.i.f. Pacific ports.

Belgian hematite and Belgian open-hearth furnace hematite as well as French pig iron of the same quality, are quoted at 525 fr. f.o.b. Antwerp, equal to $22.60 or 105s. 6d per ton.

In general the iron and steel market, notwithstanding the firmness of exchange rates, has continued weak with a tendency to lower prices. Works short of orders for the spring have in many cases accepted business at large concessions on their quoted prices. The high exchange on the dollar and pound sterling, however, saves the situation, as Belgian prices, at the present level turn out favorably abroad.

Bars for instance have been weak and were offered at £6 10s. per gross ton f.o.b. Antwerp and even less for good specifications. Beams have declined to base prices as low as £6 2s. or $26.40 f.o.b. Antwerp. Business is handicapped somewhat by the strong competition from Lorraine where production has been largely increased and German quotations also are lower than formerly.

Quotations on iron and steel products, per metric ton, are nominally as follows:

	Fr.	
Merchant bars, base	650	$28.10
Bars, open hearth	725	31.40
Rails	675	29.20
Beams, base	610	27.40
Angles, open hearth	725	31.40
Commercial iron, No. 2	700	30.30
Commercial iron, No. 3	750	32.50
Sheets, basic Bessemer:		
5 mm. and heavier	710	30.70
3 mm.	780	33.80
2 mm.	830	36.00
1 mm.	1,100	47.60

The coal market is weaker. Prices are evidently being influenced by the larger arrivals from the Ruhr, December, 1923 importation of German coal having reached 380,000 metric tons.

BRITISH MARKET AND EUROPE

Offerings of Continental Iron Depress Market—New Dock and Ship Construction

LONDON, ENGLAND, Jan. 10.—With the resumption of business after the Christmas and New Year holidays, it was expected that the demand, particularly for pig iron, would be continued and that as a result prices would have a firm tone, but during the last few days developments of an important character have taken place upon the Continent. The chief of these was the restarting of works, coupled with the depreciation in the exchange rate, and this has brought about a flood of offers of Continental pig iron both to their own markets and to overseas consumers at prices which leave British manufacturers with little hope for further business with traders here at present. The price of Cleveland foundry pig is about 99 to 100s., and continental iron can be obtained at about 87s. 6d., f.o.b. Antwerp, so that it would seem that there is a great advantage to be secured in taking continental material. However, this position may be only temporary, because without doubt there is a lot of new work to come to British plants in connection with the railroad and government schemes, while other new undertakings are being mentioned as likely to be started soon.

The export demand for steel is still poor and even continental producers do not seem to find buyers keen, their confidence having undoubtedly been shaken by the rapid fall in continental prices and by the uncertainties of the political situation on this side.

In the meantime home buying continues at a fair rate, several substantial contracts having recently been concluded. Glasgow is to erect a new dock at a cost of £2,000,000. This, when completed, will be the largest in Great Britain. It forms part of the great Shieldhall docks scheme and is being assisted financially by the Unemployment Grant Committee. Messrs. John Brown, Ltd., Clyde, have received an order from the Canadian Pacific Steamships, Ltd., for two passenger vessels of 5000 tons each for the Vancouver-Seattle service. Messrs. Workman, Clark & Co. of Belfast are to build three vessels of 10,000 tons each for the Royal Mail Steam Packet Co.

Iron and Steel Markets

PRODUCTION INCREASING

Some Accumulations of Materials Against a Coal Strike

Large Track Supply Orders—Steel Corporation Inquiry for Pig Iron

Some further increase in outputs of both pig iron and steel by the larger steel companies has come in the past week. At the same time pig iron, which for some weeks has been a laggard in the Pittsburgh district, has advanced there by 50 cents to $1 a ton under better demand. Pending railroad equipment inquiry and buying of track steel are still the conspicuous features at Chicago.

With its Chicago subsidiary operating at 93 per cent and the Carnegie Steel Co. at 91 per cent of ingot capacity, the Steel Corporation as a whole is close to a 90 per cent basis. Independent steel companies around Pittsburgh and at Youngstown range from 75 to 90 per cent.

It is apparent that final consumption has not grown since the year opened in proportion to the increase in mill schedules. A factor of which little account has been taken is a certain accumulation of pig iron, ingots, slabs and sheet bars, particularly at Central Western plants of the Steel Corporation. These stocks serve as protection against a coal strike and at the same time, regardless of the fuel situation, insure sheet, tin plate, wire and other finishing mills a supply of raw materials against the larger demand on them expected in the spring.

In this connection the inquiry of the National Tube Co. for 40,000 tons of basic pig iron for its Lorain, Ohio, plant is given no small significance.

The Steel Corporation's showing of close to $50,000,000 net earnings in the final quarter of 1923, or more than for any like period since the second quarter of 1918, reflects the higher price level reached late last year, also the success of technical staffs in counteracting the higher costs of the eight-hour day. The decline in earnings in December was in line with the reduced output in that month and the cessation of operations on the corporation's iron ore roads.

Since its organization the corporation has paid in dividends roundly $1,155,000,000 and has appropriated for new construction $1,125,000,000, or practically $1 for $1 of dividends.

The high rate of operations at the large steel plants in the second half of January, the fact that various consumers have made some increase in their stocks of steel since inventory, also the month's additions to producers' stocks of ingots and semi-finished steel make estimates as to unfilled orders at the close of the month more difficult than usual.

It is noteworthy that as a rule mills in the Pittsburgh territory are not getting orders in excess of shipments, and thus have not begun to accumulate backlog tonnages or to extend their delivery promises.

That 1924 promises to be an unusual year in railroad buying for track work appears from further orders just placed by Western roads. The Chicago & Northwestern's rail order now amounts to 46,000 tons, including 4000 tons for the Omaha, and there is also 4000 tons of angle bars. The Soo Line has ordered 8700 tons of rails and 3700 tons of tie plates. The Northern Pacific has bought 6000 tons of tie plates and the Wabash 2000 tons, while the Missouri Pacific is about to divide 12,000 tons.

The placing of a 50,000-ton rail order by the Canadian Pacific with the Algoma mill is reported from Canada.

Actual developments in the railroad equipment field are these: Orders for 3180 new cars, including 2000 steel car bodies, and for repairs to 1300 cars. Inquiries for 4300 new cars, including 4000 for the Norfolk & Western, for 1066 underframes, for repairs to 4295 cars, for a considerable number of passenger cars and for 33 locomotives besides the 100 for the New York Central.

Coincident with the appearance of the Steel Corporation's tube subsidiary in the Pittsburgh pig iron market with its inquiry for 40,000 tons a sanitary interest, which has just bought a round tonnage, is seeking 20,000 tons additional, and numerous other buyers have sent out inquiries. Pig iron has also gained strength in the South and in Chicago, Cincinnati and Cleveland, but some weakness has developed in eastern Pennsylvania.

Heavy sales of scrap of all grades in eastern Pennsylvania, estimated to have reached 100,000 tons within a week, have put prices up from 50c. to $3 a ton, the latter advance occurring on blast furnace borings and turnings. Heavy melting steel figured largely in the week's business at $20, delivered Eastern mills, a gain of $1. On the other hand, demand for scrap has subsided at Pittsburgh, but without weakening in price.

Pittsburgh

National Tube Co. Inquires for Basic—Demand for Steel Somewhat Irregular

PITTSBURGH, Jan. 29.—The local pig iron market finally has caught the stride of outside markets and is not only showing greater activity but also a definitely stronger price trend in practically all grades. This constitutes the outstanding feature of the local situation in iron and steel. Demand for steel is somewhat spotty, showing up better in some products than in others, but, on the whole, business is satisfactory and the tendency of steel plant operations still is upward.

Independent sheet makers have entered a good many contracts for the current quarter and this also is the condition of all manufacturers of tin plate, while bar makers serving the makers of cold-finished steel bars also have much business of this sort. As a general rule, however, the bulk of mill engagements was in the form of orders, this being due to the fact that higher prices are not expected and continued open weather makes possible full performance by the railroads and very prompt deliveries.

Mills in this territory are not getting orders in excess of shipments, and consequently have not yet

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 29, 1924	Jan. 22, 1924	Dec. 31, 1923	Jan. 30, 1923
No. 2X, Philadelphia‡	*$23.63*	$24.13	$24.26	$29.76
No. 2, Valley furnace†	**23.00**	22.50	22.00	27.00
No. 2, Southern, Cin'ti†	**26.55**	26.05	25.05	28.05
No. 2, Birmingham, Ala†	**22.50**	22.00	21.00	24.00
No. 2 foundry, Chicago*	24.00	24.00	23.00	29.50
Basic, del'd, eastern Pa.	**22.50**	22.75	23.25	28.00
Basic, Valley furnace	**22.00**	21.00	21.00	26.00
Valley Bessemer, del P'gh.	24.76	24.76	24.76	29.27
Malleable, Chicago*	24.00	24.00	23.00	29.50
Malleable, Valley	22.50	22.50	22.00	27.00
Gray forge, Pittsburgh	23.26	23.26	23.26	28.27
L. S. charcoal, Chicago	29.15	29.15	29.15	33.15
Ferromanganese, furnace	*107.50*	109.00	109.00	107.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	38.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	38.50
O.-h. sheet bars, P'gh	42.50	42.50	42.50	39.50
Forging billets, base, P'gh.	45.00	45.00	45.00	45.00
O.-h. billets, Phila	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.35	2.35	2.10
Light rails at mill	*2.15*	2.25	2.25	2.15

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.57	2.62	2.62	2.475
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.10
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.10
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.44
Beams, Pittsburgh	2.50	2.50	2.50	2.10
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.44
Steel hoops, Pittsburgh	3.00	3.00	3.00	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Jan. 29, 1924	Jan. 22, 1924	Dec. 31, 1923	Jan. 30, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.85	3.85	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	4.90	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$20.50*	$21.00	$20.00	$27.00
Carwheels, Philadelphia	*20.00*	21.00	19.50	24.00
Heavy steel scrap, P'gh.	22.00	22.00	19.50	22.00
Heavy steel scrap, Phila.	19.00	19.00	17.50	20.50
Heavy steel scrap, Ch'go.	18.50	18.50	16.75	19.75
No. 1 cast, Pittsburgh	21.00	21.00	21.00	24.00
No. 1 cast, Philadelphia	21.00	21.00	20.50	24.00
No. 1 cast, Ch'go (net ton)	20.50	20.50	20.00	22.50
No. 1 RR wrot. Phila.	22.00	22.00	19.00	23.00
No. 1 RR. wrot. Ch'go (net)	15.50	15.50	15.50	18.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$3.75	$9.00
Foundry coke, prompt	4.75	4.75	4.75	8.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.00	13.00	13.25	15.12½
Electrolytic copper, refinery	**12.50**	12.37½	12.75	14.75
Zinc, St. Louis	6.50	6.50	6.27½	7.12½
Zinc, New York	6.85	6.85	6.62½	7.47½
Lead, St. Louis	8.10	8.10	7.75	8.10
Lead, New York	8.37½	8.37½	8.00	8.20
Tin (Straits), New York	*48.25*	50.00	46.75	40.37½
Antimony (Asiatic), N. Y.	10.50	10.50	9.75	7.12½

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Jan. 29, 1924, Finished Steel, 2.789c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Jan. 22, 1924,	2.789c.
Dec. 31, 1923,	2.775c.
Jan. 30, 1923,	2.489c.
10-year pre-war average,	1.689c.

Composite Price, Jan. 29, 1924, Pig Iron, $22.69 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Jan. 22, 1924,	$22.19
Dec. 31, 1923,	21.88
Jan. 30, 1923,	26.79
10-year pre-war average,	15.72

begun to accumulate backlog tonnages and do not find it necessary yet to extend their delivery promises. There has been notable revival of interest on the part of melters in the pig iron market, and the week's actual and prospective business is the largest in several weeks. Basic grade has advanced $1 per ton and foundry grade at least 50c. per ton since a week ago. A large sanitary ware manufacturer recently closed for a large tonnage of Southern iron at $22.50, base, and is about ready to close on about 20,000 tons of Northern iron, all for delivery for the second quarter of the year. The National Tube Co. has put out an inquiry for 40,000 tons of basic iron for its Lorain, Ohio, works for delivery over the next four months

This quickening in the pig iron market already is beginning to be reflected in the coke market and while prices have not advanced, the tendency is in that direction. A considerable tapering off in the demand for scrap has not weakened prices because of the higher rate of steel works operation in this and nearby districts with the attendant heavy consumption of scrap and the fact that prices here are not high enough to tempt shipments away from other consuming centers. The Carnegie Steel Co. since a week ago has put on another blast furnace and before the end of the week expects to have two others in production, giving it a total of 48 out of 59 furnaces active. This company has 91 per cent of its ingot capacity in operation. Leading Pittsburgh independents are operating at 75 to 80 per cent of ingot capacity and in the Youngstown district the present rate of the larger companies has been between 85 and 90 per cent. The Jones & Laughlin Steel Corporation will put on another blast furnace this week at its south side works, giving it a total of

nine on pig iron and one on ferromanganese, out of 12 furnaces owned by this company. Expectations of an even broader market for steel later in the year and preparations for a possible interruption in operations of union coal mines around April 1 explain in part the active gate of the steel companies, reflected in the building up of reserve supplies of raw materials. There continues to be considerable quiet stocking of coal against possible exigencies arising out of the expiration of the present agreement between coal operators and the United Mine Workers of America on April 1.

Pig Iron.—This market has grown materially stronger since a week ago, and for second quarter delivery substantially higher prices are asked on all grades. All makers, including the steel companies, now are quoting $24, furnace, for No. 2 foundry for second quarter delivery, and that price finds some basis in sales, with one lot of 1000 tons, another of 500 tons and still another of 450 tons, all quoted at that price. For prompt delivery, however, the market is not yet up to that level, sales having taken place within the past few days at $23, Valley furnace, and a sanitary ware interest at present negotiating for about 20,000 tons for second quarter shipment has a quotation of $23 on part of this tonnage. The market is quotable at $23 to $24 this week, but it is doubtful whether less than the higher figure can be done after this week. A price of $22, Valley furnace, for basic iron, has been established by a sale to a Sharon, Pa., melter of 3000 tons. Merchant furnace interests now generally are asking $23 for this grade for shipment over the second quarter, and that price has been named against the National Tube inquiry. A Middle Western scrap dealer is negotiating for 10,000 tons of Valley basic iron and is said to have offered $23.25 for it; the holder wants $23.50. Such sales of Bessemer iron as have been made in the past week have been at $23, Valley furnace, but the lowest quotation now is $23.50, with some asking $24.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$22.00 to $23.00
Bessemer	23.00 to 24.00
Gray forge	22.50 to 23.00
No. 2 foundry	23.00 to 24.00
No. 3 foundry	22.50 to 23.00
Malleable	22.50 to 23.00
Low phosphorus, copper free	29.00

Ferroalloys.—The interesting development of the week has been a cut of $2.50 a ton in the price of British ferromanganese to $107.50, c.i.f. Atlantic seaboard, duty paid. Sales of British material have suffered heavily in the past few months by reason of the fact that domestic material has been available at lower prices than those named by British producers. Domestic makers took a considerable tonnage late last year at $107.50, meeting the price established by resale offerings of British alloy, but for several weeks have been quoting $109. They have now met the new British price and the market is quotable at $107.50 for either British or domestic material. The market on 50 per cent ferrosilicon shows no special change; 1924 contracts were made at anywhere from $73 to $75, delivered, and there are few important users who are not covered. Most of the tonnage was entered at the higher price and that is now the common quotation. Not much activity is observed in spiegeleisen. Prices are given on page 403.

Semi-Finished Steel.—Some of the steel makers whose business runs heavy with the automotive industry are seeking steel for early delivery and with most makers already well committed this demand imparts a strong tone to the market. Prices, however, are no higher and we continue to quote billets and slabs, based on sales, at $40, Pittsburgh or Youngstown. A recent sale of 15,000 tons of sheet bars, through an error in transmission reported as 50,000 tons last week, at less than the recognized market price, does not appear to have disturbed the market, which still is quotable at $42.50, Pittsburgh or Youngstown. Forging billets are held at $45 base, but demands are few and small. The skelp market is inactive, but with the demand for pipe on the increase, open market offerings are growing smaller. Wire rods are slow, but there is no shading of prices. Users, as a rule, are buying and specifying very close to actual needs, believing that higher prices are not immediately ahead, while the fact that deliveries are prompt encourages them to let the makers carry the stock. Prices are given on page 403.

Wire Products.—There is a very steady, though somewhat gradual increase in orders and specifications, but there are no claims that business is nearly as good as it was in January last year, nor it is up to what it was expected to be in view of the dullness over the latter part of last year and the failure of prices to weaken. Orders and specifications with one independent maker are 75 per cent of those of January last year, but this is above the general average. Both jobbers and manufacturing consumers, on account of excellent deliveries and the absence of signs of higher prices, are disposed to keep their commitments close to nearby requirements. Outside of a little irregularity in coated nail prices, the market is firm. Prices are given on page 402.

Tubular Goods.—Business in both steel and wrought iron pipe still is on a rising scale. Makers of the latter find this month's orders running ahead of those of last month by a substantial margin, and December was a better month than November. The greatest activity still is in standard pipe, but the oil situation has improved so materially in the past two months that it now looks as though drilling would be on a heavier scale than seemed likely recently and oil country goods are being sought more eagerly. Expansion in pipe business does not embrace boiler tubes, which still are slow of sale and easy, particularly welded tubes. A local boiler maker was the successful bidder for 18 boilers for the Ford Motor Co., but boiler business generally is moderate and locomotive builders are nearing the end of their orders and see few new orders before the second quarter of the year. Discounts are given on page 402.

Cold-Finished Steel Bars and Shafting.—Some makers here are doing well, while others report much room for improvement. Automotive screw machine interests are good buyers, but reports from the West of a better demand from the agriculture implement industry find no confirmation in the experience of local mills. In a broad way, ordering as distinct from contracting ahead is the prevailing rule of buyers, who find most mills making prompt deliveries and do not expect higher prices in the near future. Irregularity in business does not apply to prices, which are firm at 3c. base, Pittsburgh, except into territory where the Chicago mill quoting a Chicago base has a freight advantage. Ground shafting holds at 3.40c. base, f.o.b. mill for carload lots or more.

Hot-Rolled Flats.—Most makers are well supplied with business, particularly for delivery over the next 60 days and while current demands are light, there is not much pressure to sell and recent prices are well maintained. There are occasional concessions from the base of 3c. Pittsburgh, but there are few makers who need business badly enough to cut prices and there are few important consumers who have enough business to offer just now to bring out lower prices than those at which current shipments are being invoiced. Prices are given on page 402.

Cold-Rolled Strips.—There has been a considerable slowing down in the demand for this product, presumably because important users who have pretty well protected themselves against their immediate requirements see no occasion to buy ahead with makers making good deliveries and price advances a remote possibility. The market is not as firm at 5c. base Pittsburgh as it was recently.

Bolts, Nuts and Rivets.—Several local makers have issued new discount lists reflecting slightly higher prices in machine and carriage bolts, in lag bolts, hot-pressed nuts. The new list carries large machine bolts at 60 and 5 per cent off list, as against 60 and 10, the former discount; advances in other bolts also have been about 5 per cent. Discount on hot-pressed nuts has been cut from 4½c. to 4¼c. per lb. Small rivets are quoted at 65 and 10 per cent off list in the new schedule. New discounts are given on page 402.

Track Supplies.—Current demands are few and small, but makers here are fairly well supplied with orders, against which specifications are reported as good. The trade looks for a good year in track accessories, but is not expecting large profits, because competition for business is pretty keen. Prices are given on page 402.

Iron and Steel Bars.—Business in steel bars is described as good, and there is relatively full engagement of local capacity. Large individual orders and specifications are the exception rather than the rule. There is no change in prices of steel bars nor of iron bars, although demand for the latter is kept down by the lack of railroad business in this district.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Structural Material.—Demand is good and mills are having little trouble in getting the fabricating shops to order out material on contract. Actual business of local shops is rather moderate in relation to the amount of business they are figuring on. There is no longer any disposition to question mill prices of plain material, which will be found on page 402.

Steel Rails.—The market for light rails is still a very limited affair, and competition for the few orders being placed is sharper than it has been recently. The result is the reappearance of the price of 2.15c. base for billet rails and while most makers continue to quote 2.25c., the former figure is the basis of most of the recent sales. Rerolled rails continue to sell at below 2c. base. A number of small lot inquiries are current for standard sections for industrial plants.

We quote light rails rolled from billets at 2.15c. to 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Sheets.—The sheet industry as a whole is operating at right around 80 per cent capacity and since there is no stocking against future demands, it is apparent that orders and specifications are coming along in satisfactory fashion. Sheet makers specializing in material for the automotive industry are enjoying practically full operations. It is still possible to obtain black and galvanized sheets at slightly below quotations, but price cutting is confined to only two or three mills which did not share in the December activity because of firm adherence to full market quotations. Prices are given on page 402.

Tin Plate.—Larger producers of tin plate in this district all are operating as full as it is physically possible. Reports from the convention of the canners at Buffalo last week indicate that this year's pack of foods will be extremely heavy and this is fully reflected in specifications for tin plate. The price remains at $5.50 per base box, Pittsburgh, for standard coke.

Coke and Coal.—The spot furnace coke market does not show as much strength as it did recently, as supplies run somewhat in excess of current demands. While standard 48-hr. fuel still is quoted at $4 per net ton at ovens, sales at that figure are not made so promptly as was recently the case and cases where less has had to be taken are more numerous. The contract furnace coke market, however, is stronger, largely because producers have noted the stronger tendency in pig iron and believe they are entitled to a higher price for their coke. Such business of this sort as has been done lately has been at $4.25, and a Valley furnace interest which is figuring on starting up a furnace has been quoted $4.25 for either the next three or the next six months. Spot foundry coke still ranges from $4.75 to $5.50. Although there is considerable stocking of coal against a possible strike of union miners on April 1, the market is not perceptibly stronger. We still quote mine run steam coal at $1.60 to $2 per net ton at mines; coking coal from $1.75 to $2.15 and gas grade from $2.25 to $2.50.

Old Material.—This market is firm, but this condition finds its explanation chiefly in the fact that all outside and competing markets are at levels which make it difficult to get much material through to this center. Current purchases are few, but the fact that most steel companies are running pretty heavily in their open-hearth departments encourages dealers to expect a revival of buying after the turn of February, and there is little selling pressure. Heavy melting steel can be bought at $22 and is not quotable above that price. Compressed sheets have stiffened. Offerings of this grade for February shipment by the Westinghouse Electric & Mfg. Co. sold at $19.40, East Pittsburgh, and a recent sale was made at Canonsburg at $19.60. These prices mean $20 to $21, delivered at the nearest consuming mill. Firmness in railroad specialties is explained by steel company rather than foundry buying. Blast furnace material still is scarce and firm.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton

Heavy melting steel	$22.00
No. 1 cast, cupola size	$21.00 to 21.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	22.00 to 22.50
Compressed sheet steel	19.50 to 20.00
Bundled sheets, sides and ends	18.00 to 18.50
Railroad knuckles and couplers	23.00 to 23.50
Railroad coil and leaf springs	23.00 to 23.50
Low phosphorus blooms and billets ends	24.00 to 25.00
Low phosphorus plate and other material	23.00 to 24.00
Railroad malleable	19.50 to 20.00
Steel car axles	23.50 to 24.00
Cast iron wheels	19.50 to 20.00
Rolled steel wheels	23.00 to 24.00
Machine shop turnings	16.50 to 17.00
Sheet bar crops	23.00 to 24.00
Heavy steel axle turnings	19.00 to 20.00
Short shoveling turnings	17.50 to 18.00
Heavy breakable cast	19.50 to 20.00
Stove plate	16.00 to 17.00
Cast iron borings	17.50 to 18.00
No. 1 railroad wrought	18.00 to 18.50
No. 2 railroad wrought	22.00

December Refractories Shipments on November Level

Shipments of clay fire and silica brick, which provide the safest guide to actual business, were practically the same in December as they were the month before, according to the figures compiled and just released by the Refractories Manufacturers' Association, Frederic W. Donahoe, Oliver building, Pittsburgh, secretary. Shipments of clay fire brick in December were equal to 61 per cent of monthly economical producing capacity, while those for the previous month were 62 per cent. Slightly less capacity reported in December than in November, however.

Both December and November shipments of silica brick represented 31 per cent of monthly economical producing capacity. An interesting feature of the December record is that shipments of both kinds of brick exceeded production and that net new business in clay fire brick was almost up to the shipments.

Figures in 9-in. equivalents for December and November, figures in parenthesis being the percentage to monthly economical production of those reporting, follow:

CLAY FIRE BRICK

	December	November
Capacity reporting	74,693,894	74,839,727
Stock first of month	175,019,503(233)	170,139,089(226)
Production	44,522,602 (59)	51,860,352 (69)
Shipments	45,731,476 (61)	46,535,313 (62)
*Stock end of month	173,810,629(231)	175,464,128(233)
New orders	45,171,140 (60)	44,334,971 (59)
Cancellations	382,272 (1)	1,816,039 (2)
Net new business	44,788,868 (60)	42,518,932 (57)
Unfilled orders	56,137,138 (75)	57,449,846 (76)

SILICA BRICK

Capacity reporting	22,565,500	22,565,500
Stock first of month	36,161,384(160)	35,210,516(156)
Production	4,949,281 (22)	7,987,023 (35)
Shipments	7,012,686 (31)	7,036,155 (31)
*Stock end of month	34,097,979(151)	36,161,384(160)
New orders	5,867,865 (26)	7,818,602 (35)
Cancellations	2,506,624 (11)	878,089 (4)
Net new business	3,361,241 (15)	6,940,513 (31)
Unfilled orders	20,227,887 (90)	23,879,332(106)

*The stock on hand includes large quantities of shapes made up in advance of the receipt of actual orders and is in no sense "free stock"—that is, it could not be made to apply on new orders. The actual "free stock" of 9-in. straights on Dec. 31 was approximately as follows: Clay fire brick, all grades, 51,974,282, against 54,264,718 on Nov. 30; silica brick, 9,270,975, against 7,923,779 on Nov. 30.

Chicago

Strong Demand for Steel Bars—Farm Implement Business Improves

CHICAGO, Jan. 29.—Demand for soft steel bars is the outstanding feature of the finished steel market. January bar specifications were twice as large as those received in December. Bar orders from automotive accessory manufacturers have been particularly heavy and business from farm implement makers continues to improve. Bar mills are now well booked and are no longer able to make early deliveries on some sizes.

The situation in plates and structural shapes is still easy, although local producers have comfortable bookings and regard the outlook as favorable in view of current activity in the railroad car market and promising prospects in the building industry. Further indications that 1924 will be a big year for track betterment work are to be found in orders and inquiries for rails and fastenings. The Chicago & Northwestern and the Omaha have closed for 46,000 tons of rails and 4000 tons of angle bars, and the Soo Line has placed 8700 tons of rails and 3700 tons of tie plates.

While the price situation is generally rather firm, occasional concessions are again reported on sheets and bolts and nuts. However, it is apparent that local mills at any rate are accumulating substantial backlogs. The Inland Steel Co. is now practically obligated through the first quarter, while the improved position of the Illinois Steel Co. is reflected in another increase in operations. At both South Works and Joliet it has added a blast furnace to its active list, which now numbers 22 out of a total of 27. Its steel output has risen to 93 per cent of ingot capacity.

Notwithstanding the satisfactory condition of local bookings, there are no intimations of possible price advances. As a result there is little incentive for buyers to contract ahead and orders are largely for nearby needs. The volume of business now being placed in view of these facts is surprisingly large.

Pig Iron.—Buying is progressing at a steady pace, although it cannot yet be said that sellers are besieged with a rush of orders. Melters are deliberate in placing their needs and yet large tonnages are being purchased and important new inquiries are appearing. A South Milwaukee user has closed for 2000 tons of basic for delivery over the next four months. A local melter has bought 1800 tons of foundry for second quarter. A Wisconsin maker of machinery has ordered 1000 tons of malleable for similar delivery. A Milwaukee stove manufacturer has closed for 350 tons of foundry for prompt shipment. A Wisconsin farm implement maker is inquiring for 1800 tons of foundry, 900 tons of malleable and 300 tons of silvery for delivery over the next four months. Inquiries for 500-ton lots of foundry include one from Milwaukee, one from Minneapolis and one from a local company. Northern iron can still be bought at $24 base, Chicago furnace, although some sales have been made at an advance of 50c. a ton. We note one sale to a Chicago melter of 100 tons of foundry at $24.50, base. Little Southern iron is being marketed in this district at present because of high delivered price. Quotations of $22.50 base, Birmingham, are still current, although most furnaces are now holding to $23. A few carloads have been sold here at the latter price. Charcoal is not particularly active, but an advance in prices is looked for. A local melter has purchased 200 tons of charcoal for second quarter. The volume of silvery business has been liberal, no doubt having been stimulated by the imminence of an advance. Recent sales in Michigan aggregated 650 tons and a Milwaukee sale covered 200 tons. Two Jackson County producers have raised their price $1 a ton. A sale of 500 tons of copper-free low phosphorus for Milwaukee shipment brought out a price of approximately $33, delivered. The Thomas furnace at Milwaukee is expected to resume operations some time in February. Operations among foundries in this territory are still described as spotty, with jobbing plants less active than foundries directly connected with manufacturing industries. That the aggregate melt in this district is steadily mounting is indicated by increasing shipments from blast furnaces. Shipments from Northern furnaces in December were from 15 to 20 per cent heavier than in November, and January deliveries promise to exceed those of December by 10 per cent.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago..	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	$24.50 to 25.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00 to 24.50
Malleable, not over 2.25 sil.	24.00 to 24.50
Basic	24.00 to 24.50
High phosphorus	24.00 to 24.50
Southern No. 2	28.51 to 29.01
Low phos., sil. 1 to 2 per cent, copper free	33.00 to 34.29
Silvery, sil. 8 per cent	37.29 to 38.29

Ferroalloys.—Foreign ferromanganese is now quoted at $109, f.o.b. Baltimore or New Orleans, and it is intimated that on a large tonnage $107.50, f.o.b. Baltimore, would be done. An Illinois melter has purchased 150 tons of spiegeleisen at $38.75, New Orleans. It is said that a lower price can be done only on a relatively large tonnage. Carlots are still commanding $40, Eastern furnace.

We quote 80 per cent ferromanganese, $116.56, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, domestic, $46.31 to $48.58, delivered.

Plates.—Mills look for considerable additional tonnage in view of large prospective car orders. A revival in oil storage tank business is also expected to follow the opening up of new wells in the Oklahoma field. Plate producers are comfortably booked but can still offer satisfactory deliveries.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—Soft steel bar specifications of the leading producer during the current month have shown a 100 per cent increase over those of December. A number of automobile accessory manufacturers are inquiring for more tonnage for February delivery than in any previous month on record. Several farm implement manufacturers who have received foreign orders requiring immediate execution have placed orders and steel is being delivered accordingly. The week has been an unusually heavy one in bars and there is every indication that mills will be taxed to capacity for some time. In fact, early deliveries are no longer available on some sizes of bars. Demand for bar iron has not shown any revival comparable with that for soft steel and mills find it difficult to maintain single turn operations. Business in rail steel bars shows moderate improvement and the Chicago Heights plant of the Inland Steel Co. went on double turn today. Orders are coming from manufacturers of beds, fence posts, agricultural implements and reinforcing bar dealers. A considerable tonnage in reinforcing bars for highway building is about to be placed by contractors in Iowa, Illinois and Wisconsin.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. to 3c. base; hoops, 4.45c.; bands, 3.95c.

Cast Iron Pipe.—Cincinnati has awarded 1000 tons to the United States Cast Iron Pipe & Foundry Co. Bids received by Milwaukee on 2500 tons indicate that the American Cast Iron Pipe Co. and the United States company are respectively low bidders on different sizes of pipe. Except on the 8-in. the prices were approximately $1 under the market, indicating that sellers are still flexible when a large tonnage of desirable specifi-

cations is involved. Bloomington, Ind., has extended until Feb. 19 the date of taking bids on 640 tons. Chicago takes bids Feb. 5 on 670 tons. Fort Wayne, Ind., receives figures on the same date on 540 tons of 4-, 6-, 12- and 16-in. Mankato, Minn., took tenders yesterday on 400 tons, largely 6-in. Bedford, Ind., will take figures Feb. 18 on 300 tons of 4- and 6-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20 to $61.20; 6-in. to 10-in., inclusive, $56.20 to $57.20; 12-in. and above, $55.20; class A and gas pipe, $5 extra.

Bolts and Nuts.—A few manufacturers have advanced prices 5 per cent, making large machine bolts 60 and 5 off, but these quotations are by no means general. In fact, the market of late has been weaker than heretofore, if anything. The volume of specifications has been somewhat disappointing from some quarters, particularly from the jobbers. Trade with the automotive industry, however, is good. Prices are those shown on page 402, except that in this territory they are on an f.o.b. Chicago basis.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Sheets.—Local mills are now practically obligated for the first quarter save for small tonnages which will fit into existing rolling schedules. That a few mills are not so well booked is indicated by the fact that price concessions have not yet entirely disappeared and occasional quotations of 4.90c., base Pittsburgh, on galvanized and 3.75c. on black are still reported.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Rails and Track Supplies.—The Chicago & Northwestern, reported in THE IRON AGE of last week as buying rails, has closed for a total of 46,000 tons. Of this amount, 35,000 tons was placed with Illinois Steel Co., 5000 tons with Inland Steel Co., and 6000 tons for the Chicago, St. Paul, Minneapolis & Omaha with the Bethlehem Steel Co. Approximately 4000 tons of angle bars were also placed with Chicago mills. The Soo Line has bought 8700 tons of rails and 3700 tons of tie plates, having divided the tonnages approximately equally between the two Chicago producers. The Northern Pacific and the Wabash have placed 6000 tons and 2000 tons of tie plates respectively with local mills. The Missouri Pacific is about to order 12,000 tons of tie plates, which will probably be divided between the Colorado, Alabama and Chicago mills.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Structural Material.—Large lettings have been few, although several projects involving heavy tonnages are still pending. The American Bridge Co. has booked 1500 tons for transmission towers for the Illinois Light & Power Co., Peoria, Ill., but other awards of the week have been small. Prominent among new projects are a building for the Sawyer Amusement Co., Chicago, requiring 2000 tons and three structures for the University of Illinois, Urbana, involving 1000 tons.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Specifications, while still in encouraging volume, are not so heavy as a week ago, and no doubt have been adversely affected by the severe weather. The business outlook, however, is regarded as good in all sections with the possible exception of the Northwest. Mill prices, which are firm, are shown on page 402.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Reinforcing Bars.—Lettings during the week were few, but business prospects are regarded as favorable in view of the large amount of tonnage pending. The Snelling-Mendota bridge, Minneapolis, mentioned in another column last week, will take 3000 tons if a reinforced concrete design is used, and 400 tons of reinforcing if a structural steel plan is followed. Sargent & Lundy, engineers, Chicago, are taking bids on the sub-structure of a power station for the Columbia Gas & Electric Co., Cincinnati, requiring about 1000 tons. The concrete bars for the Chicago Tribune tower, amounting to 200 tons, will be awarded at any time. The largest bar letting of the week was 750 tons for Illinois highway work which went to the Truscon Steel Co. Awards include:

Illinois highway work, 750 tons, to Truscon Steel Co.

Butterworth hospital building, Grand Rapids, Mich., 277 tons, to Concrete Steel Co.

Chicago, Milwaukee & St. Paul Railroad, 100 tons, divided equally between American System of Reinforcing and Truscon Steel Co.

Pending work includes:

Columbia Gas & Electric Co., sub-structure for power station, Cincinnati, 1000 tons, Sargent & Lundy, Chicago, engineers.

Superior Telephone Exchange, Chicago, 125 tons, general contract awarded to Dahl-Stedman Co., Chicago.

Central Cold Storage Co. building, Blue Island, Ill., 330 tons, general contract awarded to L. Balkin, Chicago.

Old Material.—The leading steel works has closed for about 5000 tons of heavy melting, paying a maximum of $18.50 per gross ton, and another interest is expected to come into the market for a larger tonnage during the current week. An important steel foundry has purchased low phosphorus grades at $21.50 and $22 delivered, and consumer purchases of railroad malleable have been made at a minimum of $21.50 per gross ton. A blast furnace has purchased cast borings and short turnings at advancing quotations. Iron mill grades and cast scrap are quiet, and on the whole the market is lacking in buoyancy, with prices practically stationary, barring a few advances and a few declines. Railroad offerings include the Burlington, 4700 tons; the Pennsylvania, Southwestern region, 3100 tons; the Pennsylvania, Northwestern region, 1200 tons; the Chicago & Alton, 1000 tons, and the Big Four, a blank list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$21.00 to $21.50
Cast iron car wheels	20.50 to 21.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	21.00 to 21.50
Railroad tires, charging box size	21.50 to 22.00
Railroad leaf springs, cut apart	21.50 to 22.00
Rails for rerolling	19.50 to 20.00
Steel rails, less than 3 ft.	20.50 to 21.00
Heavy melting steel	18.50 to 19.00
Frogs, switches and guards cut apart	18.50 to 19.00
Shoveling steel	17.25 to 18.50
Drop forge flashings	13.00 to 13.50
Hydraulic compressed sheets	15.00 to 15.50
Axle turnings	15.50 to 16.00
Steel angle bars	19.50 to 20.00
Per Net Ton	
Iron angle and splice bars	20.50 to 21.00
Iron arch bars and transoms	20.00 to 20.50
Iron car axles	27.00 to 27.50
Steel car axles	19.00 to 19.50
No. 1 busheling	14.50 to 15.00
No. 2 busheling	10.00 to 10.50
Cut forge	16.50 to 17.00
Pipes and flues	12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	16.50 to 17.00
Steel knuckles and couplers	19.25 to 19.75
Coil springs	20.50 to 21.00
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.50 to 20.00
No. 1 agricultural cast	19.50 to 20.00
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	18.00 to 18.50
Machine shop turnings	10.00 to 10.50
Cast borings	13.50 to 14.00
Short shoveling turnings	13.50 to 14.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Brake shoes	17.00 to 17.50
Railroad malleable	19.25 to 19.75
Agricultural malleable	18.50 to 19.00

Examinations are announced for April 9 to 11 for assistant examiner in the United States Patent Office, Washington. Applicants may obtain full information from the Civil Service Commission, Washington.

New York

Continued Fair Activity in Pig Iron—Plates Obtainable at 2.30c.

NEW YORK, Jan. 29.—Fair activity in the pig iron market continues, with sales of the past week estimated at about 20,000 tons. The principal buyer was the Worthington Pump & Machinery Corporation, and its purchases were estimated to have footed up to about 5000 tons. A feature of the buying has been that frequently orders placed are for larger tonnages than named in the inquiries. In the case of a purchase of from 3000 to 4000 tons of foundry iron the price in eastern Pennsylvania is said to have been shaded, but it is not known that less than $22.50, furnace, for No. 2 plain was quoted. The $22.50 quotation is more frequent, but some furnaces are still quoting $23 for second quarter. In Buffalo the ruling quotation for either first or second quarter is $22, furnace, for No. 2 plain. The possibility of importing foreign iron is being considered in some quarters and it is likely that some iron will be brought in if the domestic market advances.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.77 to $26.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.27 to 25.77
East. Pa. No. 2, sil. 1.75 to 2.25	24.77 to 25.27
Buffalo, sil. 1.75 to 2.25	26.91
No. 2X Virginia, sil. 2.25 to 2.75	30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.94

Ferroalloys.—British ferromanganese can now be obtained as low as $107.50, seaboard, duty paid. The change from $110 was made in the last day or two. No new business at the lower levels is reported and the market is quiet. Consumers are evidently pretty well covered, the buying in the last month or six weeks having been fairly heavy for first quarter and April delivery. No change in the domestic price of $109, seaboard basis, has been noted. Imports in December were only 1907 gross tons, or the smallest for the year. These imports bring the total for 1923 to 88,570 tons, compared with 94,592 tons in 1922. Manganese ore receipts in December continued small at 12,003 tons, bringing the total for 1923 to 206,048 tons. Last year was distinguished by the fact that considerably more ferromanganese was produced in the United States than there was manganese ore imported, probably the first occasion of this kind on record. From 500 to 1000 tons of spiegeleisen has been sold recently, the price range being $38 to $40, furnace, for the 19 to 21 per cent grade, depending on the quantity involved. The ferrosilicon, 50 per cent, and the ferrochromium markets are quiet but firm.

Cast-Iron Pipe.—Municipal buying of pressure pipe has not set in on a large scale as yet, with the exception of the tender of the Department of Water Supply, Gas and Electricity, New York, for about 10,000 tons of mostly 8-in., bids opened Jan. 31. Private purchasing continues fairly active. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Buying of soil pipe is extremely light at this season and competition among producers is keen. Inquiry for late February, March and April delivery is fairly large. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 29½ to 35¾ per cent off list; heavy, 39½ to 45¾ per cent off list.

Warehouse Business.—Demand continues fair, with slight increases in the volume of orders for some products. Despite the mid-winter season, some purchasing of structural steel in small lots continues. Prices are unchanged. Shading of quotations on black and galvanized sheets is still being rather widely done. Probably the average at which small lot business is closed is not to exceed 4.75c. per lb. base on black and 5.75c. per lb. base on galvanized, while larger lots bring prices as low as 4.50c. and 5.50c. per lb. base. Pipe sellers are booking a fair volume of business considering the season and inquiries on future business promise a good tonnage in the spring. We quote prices on page 418.

Finished Iron and Steel.—A fair volume of steel business is being taken by local sales offices of steel companies, but except in structural steel and a water pipe line for New York no very large tonnages are involved. Current buying as a rule is made up of small lots from widely scattered sources, indicating that consumers and jobbers have in no way changed their attitude as to the advisability of keeping stocks well within bounds. To a small degree some of the steel companies are building up backlogs, particularly in bars, shapes and sheets. In plates the month has considerably surpassed December's sales records, but from the viewpoint of the plate mills there is room for improvement. A large Eastern producer has booked this month a tonnage equal to about 35 per cent of its capacity. Some of the smaller mills have done better, one small producer now operating at about 70 per cent, but this is well above the average of the Eastern mills. Testimony of purchasing agents of several companies at the Federal Trade Commission hearing in the Bethlehem-Midvale merger case reveals that as recently as the first half of this month quotations for plates, shapes and bars had been made at 2.30c. and 2.35c., Pittsburgh, in some instances by the leading producers. The plate market is not strong, a buyer of 3000 tons for a water pipe line having had no difficulty in covering at 2.30c., Pittsburgh, and ordinary lots are being taken at 2.35c., Pittsburgh. Some mills, however, have been getting business at 2.40c. A slight increase in prospective freight car buying by the railroads is in evidence. The largest inquiry is from the Norfolk & Western for 4000 cars. The Pennsylvania Railroad has placed orders for 3000 all-steel box car bodies.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—The market continues firm and quotations on spot carloads unchanged. Demand is fairly good and some inquiry is noted from furnaces. Standard foundry is still $5 to $5.50 per ton and standard furnace, $4 to $4.25 per ton, with medium sulphur, $3.50 to $3.75 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—The market is strong, with a distinct upward tendency. From $18 to $18.50 per ton is being paid on heavy melting steel, railroad grade, delivered eastern Pennsylvania. Borings and turnings are firm at $15 per ton, delivered eastern Pennsylvania, and in some instances as high as $15.50 per ton is paid. Specification pipe is bringing $17.50, delivered to consumers in Lebanon and Milton, Pa. Cast borings are worth $15.50 to $16 per ton, delivered to a Harrisburg consumer. Stove plate is unchanged at $16.50 per ton, delivered Harrisburg, and $16.25 per ton, delivered to New Jersey consumers. Rails for rerolling are reported strong at $19 to $19.50 per ton, the buying price, New York. With the market showing every evidence of continued strength, dealers and brokers report an evident inclination on the part of sellers to hold out for the highest prices obtainable.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$13.50 to $14.50
Steel rails, short lengths, or equivalent	15.50 to 16.00
Rails for rolling	18.00 to 19.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	18.00 to 19.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	17.00 to 17.50
Forge fire	11.50 to 12.50
No. 1 yard wrought, long	15.00 to 16.00
Cast borings (clean)	12.00 to 12.25
Machine-shop turnings	11.25 to 11.75
Mixed borings and turnings	12.00 to 12.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	13.25 to 13.75
Stove plate	13.25 to 14.25
Locomotive grate bars	15.00 to 15.50
Malleable cast (railroad)	16.00 to 17.00
Cast iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	15.50 to 16.50
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

St. Louis

Pig Iron Market Stronger and Prices Higher—Scrap Advanced

ST. LOUIS, Jan. 29.—The market for pig iron gained strength during the week, with prices firm. The St. Louis Coke & Iron Co., which is in a strong position because of recent heavy sales, advanced its price to $26 f.o.b. Granite City furnace, and sales of a small tonnage were made on that basis. Chicago iron was quoted at $24, Chicago, while $22.50 to $23, Birmingham, ruled for Southern grades. The heavy demand for basic iron has been sufficient to require all the facilities possible for making this grade, making it unnecessary to use these facilities for making foundry iron, as was the case last year. Another strengthening factor is the impression that prices have been too low, since there has been no reduction in the cost of making pig iron. Then, too, there is a general feeling of optimism which is being reflected in the pig iron market. The local maker sold during the last week 2000 tons of foundry iron to an Illinois melter and 1000 tons to an Indiana consumer for second quarter delivery and 750 tons in lots of carloads to 200 tons. An Indiana melter bought 800 tons of foundry iron for second quarter delivery. Pending inquiries include:

1000 tons of malleable for a local melter.
1000 tons of foundry for a local melter for shipment during the next two or three months.
2000 tons of wheel iron for a local melter.
600 tons of foundry iron for a northern Illinois stove foundry.
500 tons of foundry iron for a Kansas City melter.
300 tons of foundry iron and 300 tons of malleable for a southern Illinois melter.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$26.16
Northern malleable, sil. 1.75 to 2.25	26.16
Basic	26.16
Southern fdy., sil. 1.75 to 2.25 (rail)	$27.67 to 27.18

Finished Iron and Steel.—The Wabash Railway inquiry for 1,375,000 tie plates shrunk to an order for 600,000, which went to the Illinois Steel Co. The Missouri Pacific inquiry for 2,500,000 tie plates, which has been pending for about 30 days, has not yet reached the order point, and there is an impression that this, too, may be reduced. There is no buying to speak of by warehouses or manufacturers of steel products; they are waiting for orders. Demand for structural steel is light. Some fabricators are reaching out for business in other territories, so scarce is work here. The reinforcing bar business seems to be better. Recent lettings follow:

Methodist Hospital, Memphis, Tenn., 100 to 150 tons, to Pidgeon-Thomas Iron Co., Memphis.
Illinois Light & Power Co., Tecumseh, Kan., power plant, 115 tons, to Kansas City Bolt & Nut Co.

For stock out of warehouse we uote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50, and tapped, $2.50 off list.

Coke.—The market for foundry grades is extremely dull, with prices ranging from $5.50 to $6.50 for Connellsville grades. There is no interest whatever by consumers in contracts. The demand for domestic grades is good right now because of the cold weather, but as a whole it has been a bad year for ovens and dealers.

Old Material.—The only change in the quotations on old material is in car wheels, which advanced 50c. a ton, which makes that item more in line with the prevailing price of melting steel. The market generally is firm. Foundry grades are mostly in demand, although there has been some inquiry for rolling mill items. The largest offering of old material during the week is from Dodge Brothers, Detroit, 5000 tons of miscellaneous scrap. Railroad lists include: Missouri Pacific, 1700 tons; Big Four, 1000 tons of 60-lb. relaying rails and a blind list of other material; Chicago, Burlington & Quincy, 4000 tons, and Kansas City Terminal, 300 tons.

	Per Gross Ton	
Iron rails	$18.00 to	$18.50
Rails for rolling	19.50 to	20.00
Steel rails, less than 3 ft	20.00 to	20.50
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 and over	32.50 to	33.50
Cast iron car wheels	20.00 to	20.50
Heavy melting steel	17.50 to	18.00
Heavy shoveling steel	17.00 to	17.50
Frogs, switches and guards cut apart	18.00 to	18.50
Railroad springs	20.50 to	21.00
Heavy axles and tire turnings	14.00 to	14.50
	Per Net Ton	
Steel angle bars	16.00 to	16.50
Steel car axles	20.00 to	20.50
Iron car axles	26.50 to	27.00
Wrought iron bars and transoms	22.00 to	22.50
No. 1 railroad wrought	16.50 to	17.00
No. 2 railroad wrought	16.00 to	16.50
Cast iron borings	11.50 to	12.00
No. 1 busheling	15.50 to	16.00
No. 1 railroad cast	19.00 to	19.50
No. 1 machinery cast	19.00 to	19.50
Railroad malleable	17.00 to	17.50
Machine shop turnings	10.50 to	11.00
Champion bundled sheets	10.50 to	11.00

Boston

Pig Iron Business Develops Slowly, but Scrap Market Is Active

BOSTON, Jan. 29.—Pig iron business is developing slowly, sales the past week not exceeding 2500 tons, including 500 tons to the Gilbert & Barker Mfg. Co., West Springfield, Mass., and an equal amount to a Connecticut foundry, second quarter delivery, details regarding which are uncertain. Other individual sales were mostly 100 to 300-ton lots, first quarter and first quarter with a run-over into April. Additional inquiries, aggregating 2500 tons, remain inactive. The New England foundry industry is operating at a low rate, which accounts for the inactivity in the pig iron market. Indications are anticipated buying for first quarter will not develop to any appreciable degree, and that the next buying movement will be largely for second quarter delivery. A Virginia furnace the past week offered No. 2 plain, No. 2X and No. 1X at $24 furnace, or $29.92 delivered, and a Pennsylvania furnace with a Buffalo freight rate is reported to have offered high silicon iron at delivered prices under those quoted by Buffalo and eastern Pennsylvania furnaces. Otherwise, furnaces hold firmly to previously reported prices on first quarter business, and, in some instances, want 50c. a ton more on second quarter tonnages.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$26.65 to	$27.15
East. Penn., sil. 1.75 to 2.25	26.15 to	26.65
Buffalo, sil. 2.25 to 2.75		28.41
Buffalo, sil. 1.75 to 2.25		27.91
Virginia, sil. 2.25 to 2.75	30.42 to	32.42
Virginia, sil. 1.75 to 2.25	29.92 to	31.92
Alabama, sil. 2.25 to 2.75		32.60
Alabama, sil. 1.75 to 2.25		32.10

Cast Iron Pipe.—Pipe manufacturers are less inclined to make price concessions on first quarter shipments, and are maintaining full open prices on second quarter business. Medford, Mass., this week will close on 100 tons 6, 8 and 10-in. pipe; Newton, Mass., on 750 lengths of 6-in. and 150 lengths of 8-in.; Lawrence, Mass., on 150 tons of 6 and 8-in.; and Holyoke, Mass., on 200 tons New England specification 6, 8, 10 and 12-in. Wakefield, Mass., has awarded the Donaldson Iron & Pipe Co. 500 lengths of 6-in. pipe, and Marblehead, Mass., the Warren Foundry & Pipe Co. 400 tons of 12-in. pipe. Stone & Webster, Inc., Boston, has purchased 2000 tons of gas pipe, the business being split up among several manufacturers. Pipe makers quote openly on the following basis: 4-in. pipe, $72.10 delivered Boston common rate points; 6-in. to 14-in., inclusive, $67.10; 16-in. and larger, $65.10.

Shapes and Plates.—Although some sizable building projects have been indefinitely postponed pending a reduction in costs, others are showing more signs of life and give indication of closing during the first quarter. Because of the increasing activity and because of the

more comfortable position of mills, there is less inclination to shade 2.50c., Pittsburgh base on shapes, and the plate market is at least sentimentally firmer. The largest prospective structural steel business in the market is approximately 1500 tons for the Employers' Liability Insurance Building, Boston; and the largest plate business, 1500 tons for the Metropolitan Water Commission's Weston-Waltham, Mass., 60-in. pipe proposition.

Warehouse Business.—Warehouse prices on open-hearth spring steel flat bars wider than ¾-in. and thicker than 7/32-in. have been reduced from $6.50 per 100 lb. to $5, and smaller flats, as well as rounds and squares from $10 to $8. This change is the first one noted in warehouse prices in several months. Colder weather has slowed down the movement of iron and steel out of stock, yet daily bookings are running well in excess of those for the corresponding period last year. Warehouse stocks are moderately large and well assorted. Twisted chain and cable are 1c. per lb. lower. Effective Feb. 1, there will be a material change in list prices and discounts on cap and set screws. The list on flat head products will be slightly lower, but on other headed stock much higher. Larger discounts, however, make the net cost to consumer only slightly different than heretofore. Boston warehouse prices follow:

Soft steel bars, $3.51½ per 100 lb. base; flats, $4.40; plain and deformed concrete bars, $3.76½; small angles, channels and tees, $3.51½; structural steel, large angles and beams, $3.61½; tire steel, $4.80 to $5.15; open-hearth spring steel, $5 to $8; crucible spring steel, $12; steel bands, $4.31½ to $5.20; hoop steel, $5.80 to $6.30; cold rolled steel, $4.35 to $4.85; toe calk steel, $6.15; heavy plates, $3.61½; light plates, $3.86½; diamond pattern plates, stock sizes, $5.90; blue annealed sheets, $4.51½; refined iron bars, $3.51½; best refined iron bars, $4.75; Wayne, $5.50; Norway rounds, $6.60; Norway squares and flats, $7.10.

Coke.—Because of more seasonable weather, by-product coke makers are experiencing a greater demand for crushed fuel, prices for which are attractive when comparison is made with anthracite coal quotations. The movement of foundry coke from ovens, however, is slow, partly because of the inactivity of some foundries and partly because others are carrying substantial stocks. Both the New England Coal & Coke Co. and the Providence Gas Co. quote $12.50 delivered.

Old Material.—In contrast with pig iron, the scrap market is active, several thousand tons being taken the past week for shipment largely to Bethlehem Steel, Eastern Steel, American Sheet & Tube, Wheeling Steel and Alan Wood plants. Heavy melting steel, pipe and mixed borings and turnings make up the bulk of tonnage moved. Steel for eastern Pennsylvania delivery was taken at $13.50 on cars the past week, but $14.50 to $15 is the general market, while $16.25 to $16.50 was paid for selected railroad steel. Unsold yard stocks of heavy melting steel are now small. For pipe, $12.50 is the most common price paid. Forged scrap and bundled skeleton are in active demand, limited supply and easily 50c. a ton higher. Shafting is firmer, yet less active because the Bancroft & Martin Rolling Mill Co., Portland, Me., has withdrawn from the market, having purchased 50 cars. Moderate stove plate tonnages at $12.50 to $12.75 on cars, for eastern Pennsylvania, have sold. On Tuesday, Feb. 5, at 10 a. m. Eastern standard time, material estimated at 19,775 net tons, from the U. S. S. Delaware will be sold at public auction, Navy Yard, Charlestown, Boston. The material includes 12,000 tons ferrous metal, 275 tons nonferrous metal, 5000 tons armor plate and 500 tons gun forgings.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$23.00 to $23.50
No. 2 machinery cast	21.00 to 21.50
Stove plates	16.00 to 16.50
Railroad malleable	18.00 to 18.50

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.50 to $15.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long)	12.00 to 12.50
Machine shop turnings	10.50 to 11.00
Cast iron borings, chemical	12.00 to 12.50
Cast iron borings, rolling mill	11.00 to 11.25
Blast furnace borings and turnings	11.00 to 11.25
Forged scrap and bundled skeleton	10.50 to 11.00
Shafting	18.50 to 19.00
Street car axles	17.50 to 18.00
Rails for rolling	15.00 to 15.50

Buffalo

Pig Iron Demand Best in Last Three Months—Scrap Market Firmer

BUFFALO, Jan. 29.—The selling during the past week has been the best of any since the heavy November and December sales, and it looks as if the buyers are at last taking hold. Much of the inquiry quoted on has been for second quarter shipment and considerable selling has taken place for that delivery. Buying in the State appears to be quiet and the bulk of the business is coming from melters in northern New Jersey, Ohio, Connecticut and other contiguous territory. One local maker has sold upward of 10,000 tons of foundry and malleable iron. One of the orders was for 1500 tons of foundry. Several 1000-ton inquiries are out. Total sales for the week in the district are estimated at not less than 15,000 tons. While most of the sellers maintain they are quoting $22.50 on No. 2 plain, 1.75 to 2.25 per cent silicon, it is believed that freight rates and competition have frequenty driven this district's selling price on this grade of iron to $22. Reports of sales lower than $22 have been made but these are believed to have been on resale iron and isolated cases. Differentials seem to be holding up. Malleable is being quoted at $23.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$23.00 to $23.50
No. 2 foundry, sil. 2.25 to 2.75	22.50 to 23.00
No. 2 plain, sil. 1.75 to 2.25	22.00 to 22.50
Basic	22.00 to 23.00
Malleable	22.00 to 23.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Commitments for the week show a steady business but confined to small lots. More interest is being shown in bars and shapes but plates are dull. Sheet demand has mended appreciably and the price retains its firmness at 3.85c. for black and 5c. for galvanized. Some automobile business has come out and some inquiries from stove makers have been received. Wire shows a fairly steady run of buying for grades that are needed, principally nails. No buying of wire for spring requirements has yet been done. The steady business in reinforcing bars, which has characterized the entire winter season so far, continues. A substantial tonnage is being figured in connection with the construction of a school at Hamburg, N. Y., requiring also about 100 tons of structural steel. Pipe business continues brisk, with some sizable inquiries coming out to be let within the next week or so. All tinplate has been booked for first half requirements. Representatives of some of the leading companies at the canners' convention expect 1924 to be their biggest year. Alloy steel sales are satisfactory and some buying of billets and sheet bars shows a firm semi-finished market.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Warehouse Business.—The market is quiet with weather conditions somewhat against real activity, though the two or three days of really severe cold has not affected order sheets to any great extent. Warehouses believe that they will be able to run along at present scale of operations throughout the winter. No large structural or plate orders are coming out. As many orders are being booked as during the fall, but their size is smaller. Prospects are that January and February will be quiet, but March is expected to show activity. The demand just now is more for bars and sheets and manufacturers' requirements. Prices are uniform.

Old Material.—The market is beginning to feel the influence of the heavy purchasing outside, and there is more of a disposition to buy. One mill has purchased 1600 tons of hydraulic compressed sheets and flashings at $17, an exceptionally low price for this class. The same mill originally put out an inquiry for a large tonnage of heavy melting steel, but subsequently withdrew it. Other lots of hydraulic compressed have sold for $18.25. Another mill is inquiring for a sizable tonnage of heavy melting steel and is expected to buy

almost any day. This mill has recently taken some very good steel orders and, with low stocks, must buy shortly to insure operation. Opinion is divided as to what price a sizable tonnage of heavy melting steel will command. Prospective buyers have named $20 to $20.50 as the top price they will pay. Dealers are paying $20 Buffalo now. Many are figuring on a chance to eventually dispose of it at $25, Youngstown, in view of the strong demand from the Valley.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	22.50 to 23.00
No. 1 railroad wrought	16.50 to 17.00
Car wheels	20.00 to 20.50
Machine shop turnings	14.00 to 14.50
Cast iron borings	14.50 to 15.00
No. 1 busheling	16.00 to 16.50
Stove plate	18.00 to 18.50
Grate bars	17.50 to 18.00
Bundled sheet stampings	13.00 to 13.50
Hydraulic compressed	17.00 to 18.25
Railroad malleable	20.00 to 21.00
No. 1 machinery cast	20.00 to 20.50

Birmingham

Sales of Pig Iron Large and Prices Are Marked Up—Pipe Plants Busy

BIRMINGHAM, ALA., Jan. 29.—Estimates are made that sales of pig iron in the last two weeks in the Birmingham district will aggregrate around 170,000 tons. Southern furnace interests are selling pig iron on a base of $23 per ton. No. 2 foundry, delivery into the second quarter, and already one of the smaller companies is selling cautiously. The probable make of the Birmingham district was well covered by the turn of the year. Since then regular customers have been able to place business in small lots for early delivery. Prices have been advancing steadily since Jan. 1, the $22.50 per ton price being noted the earlier part of the past week and $23 being obtained the end of the week. That a $24 level will be reached within another week appears probable though it may be the middle of February before that price will be minimum. Production is showing improvement. The schedule for the second month is for the Sloss-Sheffield Steel & Iron Co. to blow in a third blast furnace at Florence-Sheffield and the Alabama Co. to resume operations at the No. 1 furnace at Gadsden. A charcoal iron furnace in blast at Shelby is a probability for February, that class of iron having taken on an advance of $1 since the turn of the year. Several lots of iron of more than 500 tons were booked during the past week. One of the prominent melters of iron of the immediate territory, purchasing soft iron, had to pay $22.50 base, No. 2 foundry. Better feeling is apparent in the iron market and indications point to necessity of greater production of iron. Surplus stock is dwindling and foundry iron will soon be very scarce on yards.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$23.00
Basic	23.00
Charcoal, warm blast	33.00

Steel.—A steady pace has been struck at the steel mills of the district, both in the ingot and finishing departments of mills, fabrication plants and other works. Additional orders for small tonnages of steel rail have been placed with the Tennessee Coal, Iron & Railroad Co. mill at Ensley, while wire and nail orders are frequent. The Tennessee company announces officially the enlargement of its steel foundry at Fairfield, capacity of plant to be increased 50 per cent. To meet the housing problem for labor in the steel mills section at Fairfield the Tennessee company is erecting two large apartment buildings, each to contain 10 apartments.

Cast Iron Pipe.—All three of the cast iron pipe works of the district, producing gas and water pipe, have received additional lettings the past week and shipments of the product will be continued and in every direction. These pipe interests have purchased pig iron in considerable quantity. Sanitary pipe interests also report contracts coming in steadily. The Birmingham Machine & Foundry Co., producing about 37 tons of sanitary pipe and fittings daily, is rushing out an order for more than 11,000 ft. of pipe for California points with many other contracts in hand. Practically all of the sanitary pipe works of the district are receiving orders and prospects are very bright.

We quote: 4-in. water, $51; 6-in., $47; larger sizes, $46; 4-in. gas, $56; 6-in., $52; standard sanitary pipe, $55; heavy gage, $45.

Coke.—No improvement is noted in the Southern coke demand and there is no warrant for increased production except where furnace interests have had some repairing done on by-product plants. Quotations for coke range between $5 and $6.50 per ton. Beehive coke output is smaller now than it has been in some time. Railroads are cooperating in the prompt handling of all business and coke shipments are without delay.

Scrap.—Heavy melting steel, except special grades, continues quiet, the largest consumer being able to hold prices and buy when tonnage is needed. Stove plate is being taken by the brake shoe company and No. 1 cast is being used by the cast iron pipe makers. The two latter old materials are commanding a little attention but no change in quotations is reported for the week except in shop turnings, now $7 to $9, and cast iron borings, now $9 to $10.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$16.00
Heavy melting steel	$13.00 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	19.00 to 20.00
Iron axles	20.00
Steel rails	12.00 to 13.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	13.00 to 14.00
Stove plate	17.00 to 17.50
Machine shop turnings	7.00 to 9.00
Cast iron borings	9.00 to 10.00

Cincinnati

Pig Iron More Active—Prices in South and Southern Ohio Higher

CINCINNATI, Jan. 29.—The pig iron market was more active last week and several large-sized orders were placed. A Kentucky melter bought approximately 15,000 tons, 11,000 Southern and 4000 Northern, for second quarter. A pipe company bought 4000 tons, a malleable shop 800 and a stove company 500 tons of Southern. In addition sales are reported of 2000 tons of charcoal and a number of round tonnage lots of silvery to Michigan melters. Prices are stronger and in the South $22.50 is now the minimum, with several furnaces asking $23. Southern Ohio furnaces have advanced to $24, Ironton, with two furnaces asking $25. Silvery prices are expected to be advanced this week. There is little activity in basic or Bessemer irons. While inquiry is not so heavy as last week, a number are current for small lots, and it is expected that buying for second quarter will be maintained through the week. Foundry operations in this district are improving and a good year is confidently expected.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.05
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.27
Basic Northern	25.77
Malleable	25.27

Sheets.—Carload orders are in good volume, and several orders running into round figures have been placed, including one for 700 tons. Prices are strong, though it is still possible to secure black sheets at 3.75c.

Warehouse Business.—Local jobbers report a decided improvement in business, but orders are still for small tonnages. Prices are firm and unchanged.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Tool Steel.—Steady improvement is reported in the demand for tool steel, due to inventory in some cases, but also to increased manufacturing activity. Prices are being firmly maintained at 75c. to 95c. per lb. for 18 per cent tungsten high-speed steel.

Finished Materials.—Orders are coming in at a satisfactory rate, and bars, especially, have shown much improvement. There have been few big orders, but it seems that all consumers have been in the market for at least part of their requirements. There has also been some fair buying of plates and shapes. It is reported that 2.40c., Pittsburgh, can still be done on plates, at least one mill having quoted that price last week. Wire products are in fair demand, though buying is spotty. A local company is in the market for leaded cable, and it is reported that it has secured substantial concessions from regular prices. Bolts and nuts continue fair, and spikes and track bolts are being placed in carload quantities. Inquiries for frogs and switches continue heavy, but orders are coming through slowly. Some interest is being shown in light rails, but tonnages are not large. Increased activity at finishing mills is evidenced by the longer deliveries.

Structural Activity.—The largest award during the week was of 1950 tons of bridge work by the L. & N. Railroad to the American Bridge Co. A number of other projects will come to a head this week, totaling about 8000 tons. New inquiries include about 1500 tons. The power plant for the Union Gas & Electric Co., bids on the foundation of which closed last week, will likely be called for shortly. It is estimated that over 5000 tons will be required.

Reinforcing Bars.—Three projects, totaling 500 tons, have been awarded, the bars being taken by the Bourne-Fuller Co. Foundation work for the new plant of the Union Gas & Electric Co., Cincinnati, requiring 1000 tons, will likely be awarded this week, as bids closed Saturday. Prices generally are firm at 2.40c. mill.

Coke.—There is little change in the coke situation. Demand continues to follow fluctuations of the weather. No apprehension is felt regarding a probable coal strike and forward buying is lacking, demand running to spot. Prices are unchanged at last week's level as follows:

Connellsville furnace, $4.00; foundry, $5.00; New River foundry, $10.00 to $11.00; Wise County furnace, $4.75; foundry, $5.75; by-product foundry, $8.00, Connellsville basis.

Fluorspar.—A sale of 500 tons of fluorspar was made last week at the regular schedule.

Old Material.—Small lot buying of scrap is the only activity in this district, but fair tonnages are moving to Valley and Pittsburgh points, where prices are considerably higher. Prices are still advancing and the list is at least 50c. higher than last week, based largely on deals made in other districts.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $13.50
Iron rails	17.50 to 18.00
Relaying rails, 50 lb. and up	31.00 to 31.50
Rails for rolling	18.00 ot 18.50
Heavy melting steel	18.00 to 18.50
Steel rails for melting	16.50 to 17.00
Car Wheels	16.50 to 17.00
Per Net Ton	
No. 1 railroad wrought	14.00 to 14.50
Cast borings	12.50 to 13.00
Steel turnings	11.50 to 12.00
Railroad cast	18.00 to 18.50
No. 1 machinery cast	21.50 to 22.00
Burnt scrap	14.50 to 15.00
Iron axles	25.00
Locomotive tires (smooth inside)	17.00 to 17.50
Pipes and flues	11.50 to 12.00

Detroit Scrap Market

DETROIT, Jan. 26.—The tone of the market on all grades of old material continues strong but no advances have been registered in the past two weeks. One of the largest producers is offering approximately 5000 tons of turnings, borings, flashings, hydraulic compressed and heavy melting steel, on a competitive basis for February delivery. With the malleable plants increasing their production slightly, and automotive shops and general manufacturing on a near capacity basis, conditions are rapidly approaching those of a year ago. Prices the same as quoted a week ago.

Cleveland

Some Pig Iron Prices Advanced—Active Demand for Bars, Plates and Shapes

CLEVELAND, Jan. 29.—The pig iron market is fairly active and prices have been advanced in some districts following the advance by the Cleveland furnaces reported last week. With the upward tendency some sellers are inclined to resist more than moderate advances. Prices on foundry iron in the Valley district have been advanced from $1 to $1.50 a ton, and one producer is now quoting $24, at which it has made several sales, although Valley iron is still to be had at $23.50 and perhaps $23. One producer has also marked up its southern Ohio prices to $24. Locally foundry iron is unchanged at $24 for Cleveland delivery, but is somewhat firmer for out-of-town shipment, for which $23.50 is being quoted. One Cleveland producer is now asking $25 for foundry iron and reports a 200-ton sale at that price. The advance in Ohio prices again makes Buffalo iron a factor in this territory and a sale of a 1000-ton lot of Buffalo iron is reported in southern Ohio at $22. One lake furnace has temporarily withdrawn from the market. Inquiry now is largely for second quarter iron. A leading sanitary interest has purchased from several producers 11,000 tons of Southern iron for its Louisville plant for the second quarter and is in the market for a round tonnage of Northern iron. Southern iron has again advanced and the lowest quotation developed on the above iron was $22.50, a considerable portion of this business being placed at $23, which seems to be the only Southern price now available. Basic iron is firm at $22, Valley furnace, with unconfirmed reports of sales at higher prices. Basic sales include a 3000-ton lot to a Sharon, Pa., consumer at around $22.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 1.75 to 2.25	29.00
Malleable	24.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	$29.00 to 30.00

Iron Ore.—Consumption of Lake Superior ore during 1923 was 62,295,386 gross tons, or approximately 1,500,000 tons in excess of shipments. Shipments by water during the year were 59,036,704 tons and the all-rail shipments will bring the total up to around 60,800,000 tons. Interior furnaces in the central district as shown by figures compiled by the Lake Superior Iron Ore Association consumed during the year 33,094,463 tons, lake front furnaces 24,372,275 tons, eastern furnaces 3,099,954 tons and all-rail furnaces, 1,728,693 tons.

Semi-Finished Steel.—The market is firmer and the supply is no longer plentiful. Consumers who depend on a Cleveland mill for supplies are compelled to look elsewhere if they have not covered for their full requirements. This producer is sold out for the first quarter, and one Youngstown mill has only Bessemer semi-finished steel to offer. A Cleveland mill during the week has purchased several small lots of slabs aggregating 5000 tons at prices between $40 to $42.50. A northern Ohio mill is inquiring for 4000 to 5000 tons of sheet bars and slabs per month up to July 1. Sheet bars are firm at $42.50.

Sheets.—The demand for sheets is holding up well and independent mills are comfortably filled with orders, some being filled for the entire first quarter. Concessions from regular prices seem to have about disappeared.

Reinforcing Bars.—Prices on rerolled bars are still very weak and some business has been taken at close to 2c., delivered Cleveland, although some mills will not shade 2.10c., mill. On soft steel bars 2.30c. appears to be the minimum. The Massillon Reinforcing Bar Co. has taken 135 tons for the Engineers' Building, Cleveland, and there is an inquiry for 120 tons for the Stern & Mann store, Canton, Ohio.

Bolts, Nuts and Rivets.—Bolt nut makers have advanced prices 5 per cent on machine, carriage and lag bolts and 25c. on hot pressed nuts. The higher prices will have little effect before April as most consumers are under contract for the first quarter. However, some small lot business has been taken at the advance. Manufacturers claim that the prices that have been prevailing have been too low to assure profits. Marked weakness has developed in the rivet market in the last day or two, owing to the need of manufacturers for orders, and 2.75c. has become a fairly common price except for small lots. Small rivets continue weak with 70 and 10 per cent off list as the extreme discount. New price lists on cap and set screws showing advances over the old lists have been issued effective Feb. 1 and with these new discounts have been issued increasing the discounts. These appear on page 402.

Finished Material.—The demand for steel bars, plates and structural material continues active. Mills are getting a good volume of orders, particularly for steel bars, but buying is not in large lots. The heaviest demand is from the automotive industry. While considerable business has been booked in first quarter contracts, a large majority of buyers are placing orders only for their early requirements or buying from month to month. They believe the prices will go no higher and that they will have no trouble in getting all the steel they need. Even some of the automobile companies are following a cautious policy and have not bought all the steel they expect to require for the first quarter. Most mills are four to five weeks behind on deliveries on steel bars, plates and structural material. Plates are moving in fair volume and the regular 2.50c. price is being held closer, although the 2.40c. price has not disappeared. No new inquiry for round lots of steel for specific work developed during the week. In structural lines a good volume of work is being figured on. In lake shipbuilding a Canadian boat requiring 5000 tons of steel is reported placed by the Matthew Steamship Co., Toronto, with the Collingwood Ship Building Co. It is expected that the 100 New York Central locomotives requiring 6000 to 7000 tons of steel will be placed in a few days. Strip steel is firmer and as a result of the stiffening of the slab market and some low prices made on wide strip to compete with sheets and light plates have been withdrawn. Prices on hot-rolled strips, hoops and bands are now being held fairly closely to 3c.

Jobbers quote steel bars, 3.36c.; plates and structual shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c; No 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Old Material.—The market continues quite active and prices have again advanced from 25c. to 50c. a ton on most grades except heavy melting steel. The National Tube Co. has made additional purchases of this grade for its Lorain plant, paying $21, or 50c. a ton more than it paid a few weeks ago. Round lot purchases of blast furnace borings and turnings are reported to have been made by Wierton and Steubenville consumers at $18 and $18.25. Locally the price on heavy melting steel is not above $19.50 for Cleveland consumption. This price owing to the absence of any recent buying is out of line with the $22 to $23 prices in the Valley district.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$19.00 to $19.50
Rails for rolling	20.00 to 20.50
Rails under 3 ft.	21.00 to 21.50
Low phosphorus melting	21.50 to 21.75
Cast borings	17.00 to 17.25
Machine shop turnings	16.25 to 16.50
Mixed borings and short turnings	17.00 to 17.25
Compressed sheet steel	18.00 to 18.25
Railroad wrought	17.50 to 18.00
Railroad malleable	21.50 to 21.75
Light bundled sheet stampings	15.00 to 15.50
Steel axle turnings	17.00 to 17.50
No. 1 cast	22.00 to 22.50
No. 1 busheling	16.00 to 16.50
Drop forge flashings	15.00 to 15.25
Railroad grate bars	19.00 to 20.00
Stove plate	19.00 to 20.00
Pipes and flues	15.50 to 16.00

Philadelphia

Weakness in Pig Iron and Greater Strength of Scrap Form Anomaly of Market

PHILADELPHIA, Jan. 29.—With prices of all grades of old material from 50c. to $1 a ton higher than a week ago, and in one instance $3 higher, the pig iron market tends slightly in the other direction. Basic pig iron is now to be had at not over $2 a ton above the price of heavy melting steel scrap. The explanation for this unusual situation is that apparently there is no surplus of scrap, while pig iron is plentiful, current production being in excess of shipments to an extent that necessitates the piling of iron at nearly every blast furnace. Heavy melting steel has reached $20, delivered eastern Pennsylvania, on heavy sales, while basic pig iron has been sold as low as $22.50, delivered, and foundry iron prices are off from 50c. to $1 a ton from the levels of a few weeks ago. This weakness in iron excites wonderment here, in view of the strength of iron prices in other producing districts.

Steel business is maintained at a fairly steady rate, with no important increase in the volume over the first three weeks of the year. Orders are moderate in size, with a fair degree of firmness in prices except in plates and shapes, where concessions are offered when attractive tonnage is in sight. The strongest demands are for wire nails, wire rods, tin plate, pipe and soft steel bars.

As predicted in this column in the issue of Jan. 17, the Pennsylvania Railroad will concentrate its purchasing organization at Philadelphia. An announcement by Samuel Porcher, general purchasing agent, says: "The practice in effect of buying and selling materials and supplies in each of the four regions separately, will be discontinued Feb. 16, 1924." Assistant purchasing agents to serve merely in a cooperative capacity will be stationed at Chicago, St. Louis and Pittsburgh.

Pig Iron.—With current production of pig iron in excess of shipments, nearly all Eastern blast furnaces are piling iron, and there has been pressure to sell in the past two weeks which has brought down prices from 50c. to $1 a ton. A few weeks ago the market was being fairly well maintained on the basis of $23, furnace, for No. 2 plain, the only concessions occurring when equalization of freight rates with competing furnaces was necessary. However, some furnaces began making offers at $22.50, base, and now fairly large lots of foundry iron could undoubtedly be bought at $22, furnace, with $22.50 to $23 for No. 2X and $23.50 to $24 for No. 1X. Not all furnaces have made such quotations, some fairly good business having been taken at $23, base, but generally the market is weak and buyers have been quick to take advantage of what may seem to them only a temporary reaction. Fairly substantial tonnages have been sold within the past week, consumers in the New England and New York territories taking more than those nearer Philadelphia. A few small sales have been made for second quarter, but on such forward buying the furnaces are less willing to make concessions, their need being orders that may be shipped immediately. Inquiries for second quarter totaling 5000 or 6000 tons, including two for 1000 tons each, are active. Basic figured largely in the transactions of the past week, purchases by two nearby consumers and one in New England reaching 10,000 tons or more. For delivery at points near Philadelphia, the delivered price was about $22.50, and there is evidence that this price could be shaded on a fairly large lot, say 10,000 tons. One of the basic buyers also took 1000 tons of Bessemer at about $24.50, delivered, and 500 tons of No. 2X at close to $24. A part of the few thousand tons of basic bought by a New England steel company is to come from India. A cast iron pipe company has bought a few thousand tons of foundry grades and is negotiating for more. Foreign iron again looms as a competitor of

eastern Pennsylvania iron. A grade equivalent to No. 2X has been offered at $23, f.o.b. cars Philadelphia, but no important transactions are reported, dealers not desiring to take the risks involved for the slight margin of profit now possible. Low phosphorus iron from abroad is available at $27, Philadelphia, and this grade also comes close to cutting under domestic prices.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.13 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	23.63 to 24.63
East. Pa. No. 1X	24.13 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivery eastern Pa.	22.50 to 23.00
Gray forge	22.50 to 23.00
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—British ferromanganese producers have instructed their selling agents in this country to quote $109, seaboard, a reduction of $1 a ton, but this price is subject to a concession of $1.50 a ton on fair-sized lots, making the market for the large buyer $107.50, seaboard. Domestic furnaces have been quoting $109, furnace, but in view of this situation have no definite quotation at present and will meet competition. The decline in ferromanganese prices is the more marked because of an increase in manganese ore quotations, Caucasian washed ore now being quoted firmly at 46c. per unit.

Semi-Finished Steel.—A sale of 500 tons of rerolling billets at $40, Pittsburgh, helps to confirm the reported strength of prices on semi-finished steel. Forging billets are not in good demand, but the price remains at $45, Pittsburgh. Wire rods are wanted by numerous consumers and the price is firm at $51, Pittsburgh.

Plates.—Reinstatement of suspended orders for several thousand tons of car plates by the Pennsylvania Railroad within the past week has helped out the situation not a little at some of the Eastern plate mills. These mills have had during January the best operation in several months, this varying from 35 per cent in the case of one large producer to 70 per cent at a smaller mill. Although a good many orders and some contracts running through first quarter are being taken at 2.40c., Pittsburgh, buyers of fair-sized lots have not been obliged to pay more than 2.35c., and in one or two instances, where the tonnage was unusually attractive, 2.30c., Pittsburgh, was the price named by a mill anxious for the business. Pittsburgh and Youngstown mills, still holding to 2.50c., are getting almost no orders in competition with Eastern mills.

Structural Shapes.—While it is likely that quotations of 2.35c., Pittsburgh, on structural shapes are still being made, it is true that some mills are less anxious for business at extremely low prices; 2.40c., and in some instances 2.50c., are appearing more frequently. Shape mills and fabricators have a fair amount of business on their books, yet there are some fabricating shops that have need of more contracts and they are making exceedingly low prices. On one local job of 1000 tons, there was a difference of more than $10 a ton between the two lowest bids and the third lowest bid.

Bars.—The demand for soft steel bars from consumers and jobbers is steady, and while the orders are usually for small tonnages there is a fair aggregate and operations of bar mills are increasing. With rare variations, the market is being held at 2.40c. Bar iron is quoted at 2.30c., Pittsburgh, by most of the Eastern mills, but one or two producers have quoted 2.25c. in a sufficient number of cases to weaken the market.

Sheets.—Demand for blue annealed sheets has not fulfilled expectations this month. Black and galvanized seem to be in fairly good demand and in most instances prices are well maintained.

Warehouse Business.—Steel jobbers are not doing a peak business, but the total is very fair. Jobbers' stocks are being replenished frequently in small lots and mills are enjoying a good demand from this source. Warehouse prices are unchanged, for local delivery being as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—Heavy sales of scrap of all grades, estimated by some to total fully 100,000 tons within a week, have given further strength to prices, the gains being unusual on some grades, as, for example, blast furnace borings and turnings, which have gone up fully $3 a ton. Heavy melting steel formed a large part of the week's sales and $20 was reached in at least two transactions.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$20.00 to $20.50
Scrap rails	20.00 to 20.50
Steel rails for rolling	22.00 to 23.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Couplers and knuckles	24.00 to 25.00
Cast-iron car wheels	21.00 to 22.00
Rolled steel wheels	24.00 to 25.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	21.00 to 21.50
No. 1 forge fire	16.50 to 17.00
Bundled sheets (for steel works)	16.50 to 17.00
Mixed borings and turnings (for blast furnace use)	16.00 to 17.00
Machine shop turnings (for steel works use)	16.00 to 17.00
Machine shop turnings (for rolling mill use)	16.50 to 17.00
Heavy axle turnings (or equivalent)	17.00 to 18.00
Cast borings (for steel works and rolling mills)	16.00
Cast borings (for chemical plants)	18.00 to 18.50
No. 1 cast	21.00 to 22.00
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	18.00 to 18.50
Stove plate (for steel plant use)	18.00 to 18.50
Railroad malleable	18.50 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	19.00 to 20.00
Shafting	25.00 to 26.00
Steel axles	25.00 to 26.00

Canadian Pig Iron and Steel in 1923

TORONTO, CANADA, Jan. 28.—The production of pig iron in Canada in December amounted to 59,662 gross tons, a slight decline from the 62,202 tons produced in November. The cumulative production for the year was 880,018 tons, as compared with 383,057 tons in 1922, or an increase of 130 per cent. The number of furnaces in blast remained unchanged at the end of the month as follows: Three by the British Empire Steel Corp., Sydney, N. S.; 2 by the Steel Co. of Canada, Hamilton, Ont., and 1 by the Algoma Steel Corp., Sault Ste. Marie, Ont.

During 1923 the average price of pig iron in Canada rose gradually from January till May. On a base of 100 for average prices in 1913, the variation in prices during the first 5 months was from 177.1 in January to 194.3 in May. In June the index stood at 188.6, from which point it gradually declined to 142.9 in November; there was a slight recovery to 148.6 in December. Rolling mill products, on the other hand, rose more gradually from an index of 149.9 in January to 166.6 in June; slight recessions and recoveries followed, the year closing with steel prices at a maximum of 169.1 in the same index.

The production of ferrosilicon rose to 2930 tons in December, a slight increase over the 2824 tons reported in November. The output for 1923 was 28,961 tons, an increase of 40 per cent over the 20,749 tons produced in 1922.

Steel ingots and castings dropped to 41,248 tons in December, a decline of 25 per cent below the output of 54,674 tons reported in November, and was the minimum reported for any month during the year just closed. The production of steel ingots and castings for 1923 was 884,770 tons as compared with the output of 485,653 tons during 1922.

EXPORT TRADE QUIET

Japanese Business Almost at Standstill—Negotiations for Manganese Ore—French Pig Iron Offered

NEW YORK, Jan. 29.—Inquiry for export is extremely quiet with Japanese business, particularly, almost at a standstill. Business with Japan, however, is expected to improve as the spring approaches, particularly should there be an extension of the present suspended duties on iron and steel products. There is a persistent rumor that some such action will be taken before long.

While there is but little inquiry from China, exporters report small orders from time to time for wire shorts, tin plate wasters, etc., when the quotation is sufficiently low to meet the buyers' idea of cheapness.

The Chilean State Railways will close Feb. 2 on 2300 tons of structural steel for use in small bridges and buildings. A tender on other materials is expected from this railroad in the spring.

Importers of steel are active in obtaining quotations from European mills, but nothing of any size is known to have developed into orders for foreign steel.

There is an active demand for manganese ore and an importer representing producers of the Caucasus, who has booked a total of 100,000 tons of ore for delivery over the first half of this year to furnaces in the United States, reports negotiations at present for a contract totaling close to 100,000 tons. The price is firm at 43c. per unit for ordinary and 46c. per unit for washed ore.

Importers of pig iron are actively offering French foundry iron to sellers and consumers here, but thus far the price is too high to be competitive. With the prospects of better coal and coke supply in France and Belgium, however, and the possibility of a higher American pig iron market, importers feel that importation on a small scale may be possible before long despite the recent increase in ocean freights. At present $24 per ton, c.i.f. Atlantic port, duty paid, is about the best offer possible on French low phosphorus foundry iron, with medium sulphur at about $22.25. One importer is negotiating with a German interest for a fair tonnage of hematite iron, now on yards at a furnace close to a German port and expects to obtain sufficiently low prices to offer it here advantageously.

Santa Fe Issues Machine Tool List

The Santa Fe has issued a list of 19 machine tools and it is understood that numerous additional inquiries will follow. The items on which prices have been asked include the following, all of which are to be motor-driven:

One 21-in. x 6-ft. heavy duty universal turret lathe.

One 25-in. x 7½-ft. heavy duty universal turret lathe.

Two 18½-in. x 6-ft. cabinet base motor-driven turret lathes.

One J-28 Gisholt or equivalent turret lathe.

One 2-in. x 24-in. flat turret lathe.

One No. 3 Cincinnati Acme or equivalent flat turret lathe.

One wet emery grinder with 1-in. spindle and 1½ x 10-in. wheels.

Eleven double wet emery grinders with 1¼-in. spindles and 3 x 24-in. wheels.

Frank Samuel & Co., Philadelphia, announce the closing of their Pittsburgh sales office and the appointment of Walter-Wallingford & Co. as their representatives in the Pittsburgh territory. The latter already represent Samuel & Co. in Cincinnati and Chicago. H. E. Tomlinson, who has been in charge of the Pittsburgh office of Frank Samuel & Co., has become associated with Walter-Wallingford & Co. in their Pittsburgh office as assistant to George A. Wilson, district manager.

Progress in Scientific Management

(*Concluded from page* 366)

controlling factor in management was cited as a hopeful tendency. Conclusive examples were perhaps hard to find, but sign posts are not lacking, he said, and offered the following for consideration.

The first of sign posts cited was the growing tendency to consider man's probable behavior on the basis of experience, in place of reasoning according to prescribed rules of man's behavior.

Second is the increasing tendency toward the decentralization of authority, and the substitution of clearly defined responsibility for duties, and the keeping of accounts in terms of cost and revenue growing out of these responsibilities. This indicates, he said, a recognition of the effectiveness of trusting to man's egotistical reactions to opportunity accorded him as an individual.

"Modern biology and psychology" he said, "teach us that man is primarily emotional, that he is descended from primitive forms of life and that his reactions are still dominated by primitive emotions, such as fear, rage, desire for comfort, etc. Only secondarily, and after control of his emotional reaction does he become subject to reason and the spoken word.

"Executives are unconsciously beginning to study the probable reaction of those they direct, regardless of the reasonableness of such emotion. Where executives used to spend days over the resonableness of their proposals, they now try to forecast the probable reaction of their employees.

"I feel that this modern view of man strikes definitely at the barrier which has stood in the way of the development of management as a science. The tendency whether conscious or unconscious which I see among executives to accept the findings of modern biology and psychology as the basis for dealing with man, is the most hopeful sign of the day."

Frank B. Gilbreth, consulting engineer, Montclair, N. J., in the discussion following the paper, characterized Mr. Williams' paper as epoch making. Wallace Clark, consulting engineer, New York, also commended the paper as forward looking, and stated that progress of the next ten years will be toward the applying of engineering to influencing men's minds.

The reaction of the meeting led Mr. Williams to propose that the Taylor Society be the first to definitely recognize that psychology is a factor in management by including it in the activities of the society and incorporating the subject more pronouncedly in its meeting programs. A vote taken indicated approval of this proposal, Dr. H. S. Person, managing director of the society saying that steps in this direction had been contemplated. Robert T. Kent, consulting engineer, Montclair, N. J., was chairman of the session.

Other Papers Presented

The application of scientific management principles and methods to marketing problems was outlined in a paper on "Scientific Management In Selling and Advertising" by Stuart Cowan, J. Walter Thompson Co., Cleveland.

The extent to which the management of the public business, which was characterized as the last stronghold of resistance of the traditional and inefficient in management, has been influenced by scientific management ideals was reviewed in a paper on "Scientific Management Federal, State and Municipal Business," by Morris L. Cooke, Philadelphia.

A paper by Frank B. and Lillian M. Gilbreth, Montclair, N. J., dealt with scientific management in other countries than the United States.

Plans for the merger of the J. E. Moss Iron Works, Wheeling, W. Va., with the Riverside Bridge Co., Martins Ferry, Ohio, have been completed according to J. E. Moss, president of the former. The consolidated company will be one of the largest structural steel concerns in the Ohio Valley.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Glavanized wire No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 5 per cent off list
Machine bolts, all sizes, cut threads..60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 5 per cent off list
Carriage bolts, cut threads, all sizes.50, 10 and 5 per cent off list
Lag bolts .....65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ x 4 in.,
50 and 5 per cent off list
Larger and longer sizes.....50 and 5 per cent off list
Hot pressed squares or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4c. off list
C.p.c. and t. square or hex. nuts, tapped.....4c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Bolt ends with cold pressed nuts.....50 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50

	Per 1000	
	S. A. E.	U. S. S.
⅝-in.	$15.00	$15.00
¾-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws.....75, 10 and 5 per cent off list
Milled standard set screws, case hardened
75, 10 and 5 per cent off list
Milled headless set screws, cut thread
75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread
80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread
80, 10 and 10 per cent off list
Milled studs.....65 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb..$2.75 to $2.90
Small rivets .....65 and 10 per cent off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb.....$3.05 to $3.15
Spikes, ½ in., 7/16 in. and ⅝ in., per 100 lb..... 3.25 to 3.50
Spikes, 7/16 in..... 3.25 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜.....+11		+39
¼ to ⅜.....	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6.....	59	47½	2½	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	41½	7 to 12.....	26	11
11 and 12....	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3.....	61	50½
¼ to ⅜.....	47	30½	¼ to ⅜.....+19		+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½.....	60	49½	1 to 1½.....	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12....	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1½ in. .....+18	
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....+ 8	
3 in.	40	2 to 2¼ in.....— 2	
3¼ to 3¾ in.....	42½	2½ to 3 in.....— 7	
4 to 13 in.....	46	3¼ to 4½ in.....— 9	

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		

Hot Rolled

3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be hold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage.....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage...	15
2¼-in. O.D. 12 gage..	17	5⅝-in. O.D. 9 gage...	55
2¼-in. O.D. 11 gage..	18	5½-in. O.D. 9 gage...	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3c.
Box Annealed, One Pass Cold Rolled
No. 28 (base), per lb.....3.85c.
Automobile Sheets
Regular auto body sheets, base (22 gage), per lb.....5.35c.
Galvanized
No. 28 (base), per lb.....5c.
Long Ternes
No. 28 gage (base), 8-lb. coating, per lb.....5.30c.
Tin-Mill Black Plate
No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	46c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	43c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$109.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	107.50
Ferrosilicon, 50 per cent, delivered	$74.00 to 75.00
Ferrosilicon, 75 per cent	140.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....$38.00 to $40.00
Spiegeleisen, domestic, 16 to 19 per cent..... 37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines 23.50
Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00

Silica Brick:	
Pennsylvania	42.00
Chicago	49.00
Birmingham	50.00
Ground silica clay, per net ton	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain mangnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	48.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c.
Skelp, sheared, per lb.	2.35c.
Skelp, universal, per lb.	2.35c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	$5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43	*Pacific Coast	$1.15
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown Comb	0.19	Kansas City (pipe)	0.705	Birmingham	0.53
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60	Memphis	0.56
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735	Jacksonville, all rail	0.70
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705	Jacksonville, rail and water	0.415
Boston, domestic	0.365	Chicago	0.34	Denver	1.26	New Orleans	0.67
Boston, export	0.255			†Denver (pipe)	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Bookings of 25,000 Tons and Fresh Projects for Nearly as Much

Activity in the fabricated steel field is shown by awards in the past week in sizable jobs totaling 25,200 tons, compared with 32,000 tons, the average of the preceding four weeks, and by inquiries of 21,000 tons, compared with 39,000 tons, the past four weeks' average. Private enterprises account for over one-half in both pending and settled business. Awards include:

Loft building, Thirty-ninth Street and Seventh Avenue, New York, Shroeder & Koppel, Inc., general contractor, 2500 tons, to McClintic-Marshall Co.

City of New York, fabricated water pipe line to Staten Island, 3000 tons of plates, fabrication awarded to Staten Island Shipbuilding Co.

Apartment buildings, 1040 Park Avenue, New York, 1200 tons, and 269 West Seventy-second Street, 450 tons, to Bethlehem Fabricators, Inc.

United Cigar Stores Co., addition to building at Vanderbilt Avenue and Forty-second Street, New York, 1000 tons, to Levering & Garrigues Co.

Adirondack Power & Light Co., building at Amsterdam, N. Y., 500 tons, to Shoemaker Bridge Co.

Standard Oil Co., oil tanks located through New York State and New England, totaling 4500 tons, divided between Petroleum Iron Works and Warren City Tank & Boiler Co

Masonic Temple, Springfield, Mass., 950 tons, to Lehigh Structural Steel Co.

Westinghouse Electric & Mfg. Co., plant addition at Essington, Philadelphia, 1400 tons, to McClintic-Marshall Co.

Peddie Institute, Hightstown, N. J., addition, 250 tons, to American Bridge Co.

Mutual Potteries Co., Trenton, N. J., addition to plant, 300 tons, to American Bridge Co.

City of New York, central motor repair station, 10,000 tons; report published in Jan. 24 issue that work was awarded to New York Shipbuilding Corporation is officially confirmed.

Railroad Cooperative Building & Loan Association, building on Lexington Avenue, New York, 1000 tons, to A. E. Norton, Inc.

Bellevue Hospital, New York, addition, 2000 tons, to A. E. Norton, Inc.

Apartment building, 55 East Eighty-sixth Street, New York, 900 tons, to Taylor-Fichter Steel Construction Co.

Illinois Light & Power Co., Peoria, Ill., transmission towers between Keokuk, Iowa, and Galesburg, Ill., 1500 tons, to American Bridge Co.

Thorpe Brothers, Minneapolis, office building, 107 tons, to American Bridge Co.

Fair Store, Chicago, addition to mezzanine floor in subbasement, 112 tons, to American Bridge Co.

Standard Safe Deposit Co. building, Chicago, 314 tons, to American Bridge Co.

Mobile & Ohio Railroad, single track through riveted truss span, 178 tons, to Virginia Bridge & Iron Co.

Chicago, Burlington & Quincy Railroad, deck plate girder spans, three steel viaduct towers, 367 tons, to American Bridge Co.

Wilcox Co., sand and gravel bridges, Bardwell, Wis., 108 tons, to unnamed fabricator.

High school, South Bend, Ind., 200 tons, to Rochester Bridge Co.

Louisville & Nashville Railroad, bridge repairs, 1900 tons, to American Bridge Co.

Haynes & Langenberg Furnace Co., St. Louis, factory building, 150 tons, to Atlas Iron Works.

Arthur G. McKee & Co., Cleveland, 300 tons for bins for Pittsburgh district blast furnace plant, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

General Baking Co., Brooklyn, 750 tons.

James A. Hearn & Son, Inc., addition to store on Fourteenth Street, New York, 400 tons.

Theater, Indianapolis, Ind., 700 tons; bids taken but work has been indefinitely postponed.

Boston & Albany Railroad, station at Springfield, Mass., 800 tons.

Southern Railway, two shops at North Birmingham, Ala., 2000 tons; Dwight P. Robinson & Co., New York, contractors.

Fifth Avenue Presbyterian Church, New York, community house, 500 tons.

Delaware, Lackawanna & Western Railroad, bridges, 1200 tons; bids taken this week.

Bell office building, Michigan Avenue and South Water Street, Chicago, 300 tons.

Sawyer Amusement Co., combination theater, store and apartment building, Chicago, 2000 tons.

University of Illinois, library, gymnasium and hospital buildings, Urbana, Ill., 1000 tons.

Riding club building, Chicago, 700 tons.

Pennsylvania Railroad, bridge, Auglaize, Ohio, 350 tons.

Lerner Theater, Elkhart, Ind., 300 tons.

Employers' Liability Insurance building, Boston, 1500 tons.

Metropolitan Water Commission, State House, Boston, 60-in. pipe line between Weston and Waltham, Mass., 1500 tons of plates.

Peabody Hotel, Memphis, Tenn., 1200 tons.

Catholic infirmary, Louisville, Ky., 600 tons.

Union Trust Co., Huntington, W. Va., office building, 300 tons, bids being taken.

Coal Exchange, Huntington, W. Va., 800 tons, being refigured.

General Match Co., Reading, Ohio, factory building, 250 tons, bids being taken.

Union Gas & Electric Co., Cincinnati, foundation work for new power plant near Cincinnati, 1500 tons sheet piling, bids in.

United Saving & Banking Co., bank and office building, 1600 tons.

Cleveland Trust Co., branch bank building, 150 tons.

RAILROAD EQUIPMENT BUYING

More Car Purchases and Car Inquiries—Considerable Repair Work

Besides 2000 steel car bodies for the Pennsylvania, purchasing of the past week in the railroad equipment field covered 1180 new cars and repairs for 1300 cars. Inquiries appeared for 4300 new cars, for underframes for 1066 cars, for repairs for 4295 cars, for 133 locomotives and for considerable passenger train equipment. Among the items are the following:

The Pennsylvania Railroad has placed orders for 3000 all-steel box car bodies as follows: Newport News Shipbuilding & Dry Dock Co., 1000; Standard Tank Car Co., 1000.

The Philadelphia & Reading Railroad, mentioned last week as having distributed orders for 1000 70-ton all-steel hopper cars, made awards as follows: Pressed Steel Car Co., 400; Standard Steel Car Co., 200; American Car & Foundry Co., 200; Bethlehem Steel Corporation, 200.

The Chile Exploration Co. has ordered 80 ore cars from the Pressed Steel Car Co.

The Chesapeake & Ohio Railroad has let orders for the repair of 1000 freight cars, of which the Richmond Car Works will repair 500 and the American Car & Foundry Co. 250, the remaining 250 having been given to an unnamed car shop.

The Fruit Growers' Express is in the market for 100 steel underframes for repairing cars.

The Lehigh Valley Railroad has asked for prices for the repair of 200 box cars.

The Norfolk & Western Railroad has issued an inquiry for 4000 all-steel hopper cars.

The Seaboard Air Line has given an order for the repair of 300 phosphate cars to the Tampa Dry Dock, Tampa, Fla.

The Bangor & Aroostook Railroad has ordered 75 car underframes and superstructures from the Pressed Steel Car Co.

The New York Central has awarded 500 box cars for the Rutland to the Youngstown Steel Car Co.

The Illinois Central is inquiring for repairs on 2095 miscellaneous freight cars.

The Louisville & Nashville has postponed until after Feb. 1 the placing of 3000 freight cars.

The Pullman Co. is building 100 standard sleeping cars for its own service.

The Universal Portland Cement Co. is inquiring for 50 hopper cars.

The Nashville, Chattanooga & St. Louis is in the market for 50 steel hopper ballast cars of 55-ton capacity.

The New York Central is asking for figures on various types of freight cars and it is said that its purchases will reach 18,000 cars.

(*Continued on page* 405)

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Jan.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
23.....	13.00	12.50	51.00	8.37½	8.10	6.85	6.50
24.....	13.00	12.50	50.62½	8.37½	8.10	6.85	6.50
25.....	13.00	12.50	50.00	8.37½	8.10	6.85	6.50
26.....	13.00	12.50	....	8.37½	8.10	6.85	6.50
28.....	13.00	12.50	48.50	8.37½	8.10	6.85	6.50
29.....	13.00	12.50	48.25	....	....	6.85	6.50

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Jan. 29.

The most active market has been in copper, in which heavy sales are reported. Tin, after reaching higher prices, has declined. The lead market continues strong, with demand substantial, and there has also been good buying of zinc with the market firm.

Copper.—The heavy buying, which was in progress a week ago, continued in large volume up to and including Friday, Jan. 25, since when demand has slackened decidedly. It appears that a really heavy buying movement has been in progress and that sales have run into many thousands of tons, both for domestic and foreign consumption. The feature of this movement has been a marked steadiness in prices, the advance in the last week having been only ⅛c. per lb. In previous large buying movements the ascent of prices has been usually too sharp and the decline following the movement has usually been equally marked. While consumers and dealers are now fairly well covered for at least the first quarter and part of the second, it is not expected that prices, as in the past, will decline to any extent. The foreign buying, which has been fairly liberal, has been largely by France and Germany. Electrolytic copper can still be obtained at 12.75c., delivered, with most producers asking 12.87½c. Lake copper is unchanged at 13c., delivered.

Tin.—Supplies of Straits tin from the East are coming in rapidly, and it is estimated that the January shipments from the Straits alone will total about 8100 tons. If this is so, it will be a record. With the December shipments also large, there is evidently plenty of metal in sight. These shipments also mean that consumers have also been buying liberally, but it is now suspected that they may defer purchases for a month or two. Present indications point to these estimates as being correct because the market is quiet and prices have declined quite sharply. Opinion in the market, however, is to the effect that periodical declines will be temporary and that there may be another advance to levels still higher than the recent ones. A fair business has been done in the past week, but the market was quiet on the surface. Spot Straits tin was scarce up to Friday, Jan. 25, the premium over futures having been about 2c., but this dropped yesterday to ⅜c., or 48.50c., compared to 48.12½c. In the last week about 350 tons was sold on the New York Metal Exchange. After advancing to 51c. on Jan. 23, spot Straits tin was quoted today at 48.25c., New York. London prices were about £1½ lower per ton than a week ago at £248 10s. for spot standard, £249 10s. for future standard and £251 15s. for spot Straits. Arrivals thus far this month have been 5940 tons, with 5322 tons reported afloat.

Lead.—Very little change is noted in the general situation. The price of the leading interest continues unchanged at 8c., New York, but in the outside market February-March delivery is bringing anywhere from 8.30c. to 8.50c., New York, or 8.10c. to 8.25c., St. Louis. Spot metal is as scarce as ever.

Zinc.—A fair business in prime Western has been done, with galvanizers the principal buyers, and the market has been decidedly firm. There has been no change in quotations during the week, and prime Western for early delivery is still quoted at 6.50c., St. Louis, or 6.85c., New York. Sales to large galvanizers of 600 and 300-ton and smaller lots are noted. The market had an easier tone today with the possibility of the foregoing quotations being slightly shaded.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 29c. to 32c. per lb.

Antimony.—Chinese metal is still scarce and wholesale lots for early delivery are still quoted at 10.50c. per lb., duty paid, New York, the minimum quotation.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27.50c. to 28c. per lb., duty paid, delivered, by importers able to obtain the metal from foreign producers. Quotations from the leading American producer are not obtainable.

Old Metals.—Business is more active and values are firm. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	10.00
Heavy machine composition	10.50
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	6.75
Lead, heavy	7.50
Lead, tea	6.50
Zinc	5.00
Cast aluminum	18.50
Sheet aluminum	18.50

Chicago

JAN. 29.—Demand for zinc and copper has been fair with prices unchanged. Lead orders have been insufficient to prevent a slight decline. Tin has declined in sympathy with weakness in the London market. The used metals are unchanged. We quote in carload lots: Lake copper, 13.25c.; tin, 49.50c.; lead, 8.25c.; spelter, 6.55c.; antimony, 12c., in less than carload lots. On old metals we quote copper, copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 7c.; lead pipe, 6.75c.; zinc, 4.25c.; pewter, No. 1, 28c.; tin foil, 34c.; block tin, 39c.; all buying prices for less than carload lots.

RAILROAD EQUIPMENT BUYING

(*Continued from page* 404)

The Union Pacific has placed 500 12,500-gal. 50-ton tank cars, having divided them equally between the Standard Tank Car Co. and the American Car & Foundry Co.

The Santa Fe is inquiring for 200 dump cars in addition to 5000 cars mentioned last week.

The Philadelphia & Reading has let 50 stock cars to the Standard Steel Car Co.

The New York Central is inquiring for 30 or more steel underframes for stock cars for the Rutland.

The Landreth Gasoline Co., Breckenridge, Tex., placed 50 8000-gal. 40-ton tank cars with the General American Tank Car Corporation.

The Maine Central is inquiring for 2 Pacific type and 6 Mikado type locomotives.

The Atlantic Coast Line is inquiring for 20 Pacific type and 5 switching type locomotives.

The New York Central is inquiring for 100 locomotives, as mentioned last week in the Cleveland steel market letter.

The *Shaft* is the name of the latest addition to the family of company publications, that of the Edgar T. Ward's Sons Co., Newark, N. J. Thomas Dreier is editor. The first number has four pages, and while the leading article is captioned, "A Refreshing Adventure in Advertising," the refreshing feature of the publication is the moderate amount of space given to advertising the company. There is much worth-while reading matter and incidentally the title is quite appropriate, not alone because the word "shaft" is defined as a means of transmitting power and service, but because of the company's affiliation with an important shafting manufacturing interest.

PERSONAL

A. E. Lindau has resigned as vice-president and J. T. Hanley has resigned as western manager of the Corrugated Bar Co., Inc., to become president and vice-president, respectively, of the American Wire Fence Co., Otis Building, Chicago, which operates the American system of reinforcing, fabricator and dealer in reinforcing material. Mr. Lindau has been with the Corrugated Bar Co. for 19 years and Mr. Hanley 13 years. They have both been elected directors of the American Wire Fence Co. and will have the active management of the company's business. Arthur A. Clement, for some years president, has resigned to devote his time to other interests, but still retains membership on the board of directors and will be secretary and treasurer of the company. Mr. Lindau is a graduate of the engineering department of the University of Michigan, of the class of 1900. For a short time after graduation he was connected with a commission appointed by Governor Pingree to appraise the value of railroad property in Michigan. A short time spent with the Whiting Foundry Equipment Co., Harvey, Ill., was followed by experience in bridge detailing and design with the Wisconsin Bridge Co., the Chicago, Burlington & Quincy Railroad, and later as assistant engineer in the bridge department of the Rock Island Lines. As reinforced concrete construction seemed to offer a new field for development, he sought and found an opening with the Corrugated Bar Co., at that time located in St. Louis. In 1906 he succeeded A. L. Johnson as chief engineer, and upon the latter's departure for an extended stay in Europe assumed the responsibility for the development of the engineering department, as well as new products and methods of construction. In 1910 he redesigned the deformed bar marketed by the company and introduced the round deformed bar for which he was granted letters patent. A number of other patents were granted him and exploited by the company, chief of which was the flat slab construction known to the trade as Corr-Plate floors. At the time the company moved its general offices to Buffalo, Mr. Lindau was made western manager in charge of business in the Middle West, which position he held until 1916, when he was called to Buffalo to become general manager of sales. In 1918 he was made a member of the board of directors, and in 1921 elected vice-president. Mr. Hanley is a graduate of the engineering department of the University of Illinois, class of 1910. He was employed for a time in the bridge department of the Illinois Central Railroad and by the Leonard Construction Co., and joined the sales department of the Corrugated Bar Co. in 1911. In 1916 he succeeded Mr. Lindau as western manager, with headquarters at Chicago, in which capacity he has served until his recent resignation.

A. E. LINDAU

J. T. HANLEY

Dr. Charles S. Howe, president of Case School of Applied Science, Cleveland, will have conferred upon him an honorary membership in the Cleveland Engineering Society, Feb. 5. The principal speaker on the occasion will be Newton D. Baker, former Secretary of War, who will deliver an address on "The Military Engineer." Dr. Howe became professor of mathematics and astronomy in Case School in 1899 and was elected president in 1902. In addition to his duties at the head of that institution, he has been very active in educational and civic work in Cleveland and has written many articles on astronomy and other subjects. He has served as president of the Cleveland Engineering Society, Cleveland Chamber of Commerce and other organizations.

Charles W. Tubby, who for many years has been district manager in charge of sales and engineering for the Worthington Pump & Machinery Corporation at the St. Paul office and for the last four years at the Seattle office, has resigned and after Feb. 1 will again be active in similar work in Seattle.

John R. Foster has been elected vice-president of the David J. Joseph Co., Cincinnati, and will make his headquarters in the Pittsburgh office of the company. Before joining the Joseph company he was an official of the National Sales & Trading Co., Cleveland, and has had wide sales experience in pig iron and steel.

R. L. Patton, formerly associated with the Bourne-Fuller Co. in its Pittsburgh office, has joined Walter-Wallingford & Co. and will be located in the Pittsburgh office.

D. T. MacLeod, vice-president Elkhorn Piney Coal Mining Co., St. Clair Coal Mining Co., and the Milwaukee Coke & Gas Co. during the past seven years, has resigned from these companies to become president and treasurer of the Racine Radiator Co., Racine, Wis.

Clayton R. Burt, vice-president Austin Machinery Corporation, Chicago, has been elected president to succeed A. B. Linderman, who will continue to be a stockholder and director and will act in an advisory capacity to the new management. Mr. Burt was formerly president of the New Process Gear Co., Syracuse, N. Y.

Hunter Morrison has resigned as director and sales manager of the Hill Clutch Co., Cleveland, to become vice-president and general manager of the Metal Stamping & Mfg. Co., that city.

Charles Pack, vice-president Doehler Die Casting Co., addressed a meeting in Brooklyn of the American Society of Mechanical Engineers, on the evening of Jan. 29, in the auditorium of the Brooklyn Polytechnic Institute on "Die Casting."

H. W. Townsend, formerly general superintendent of the Aldrich Pump Co., Allentown, Pa., has been made district sales manager with headquarters at Tulsa, Okla.

Theodore H. Miller, works manager of the DeLaval Separator Co., Poughkeepsie, N. Y., sailed for a two months' visit to Europe on Jan. 23.

M. Lund has established a business as the Lund Engineering Works, Grand Rapids, Mich., designers and builders of special machinery.

John E. Cobaugh, Stephen Girard Building, 21 South Twelfth Street, Philadelphia, has been appointed sales representative in the Philadelphia territory for the H. J. Ness Mfg. Co., 48 Howard Street, New York, manufacturer of Nessweld spot welders.

Glendon M. Pomeroy has been made treasurer and a director of the Matthews Mfg. Co., Worcester, Mass., manufacturer of metal stampings, to fill the vacancies caused by the death of Frederick Lines. The management is not changed otherwise, Fred S. Morton remaining as president. Mr. Pomeroy has been with the company for several years as sales manager.

William La Coste Neilson, vice-president and general sales manager of the Norton Co., Worcester, Mass., is making an extensive tour of Great Britain and western Europe on business for the company. He will be absent for about two months.

L. H. Collingwood, for nine years associated with

the Pittsburgh office of the Pittsburgh Piping & Equipment Co., has become associated with the American Foundry & Construction Co., Pittsburgh, as assistant manager of sales.

J. A. V. Scheckenbach has been appointed general improvement engineer in charge of improvement and research for the American Car & Foundry Co., with headquarters at 165 Broadway, New York. He has been connected with the Car & Foundry company since 1909 and has served as construction engineer and assistant chief engineer.

V. L. Whitehead, Sr., was elected chairman of directors at a recent meeting of the Whitehead Brothers Co., dealer in foundry supplies, Providence, R. I. Other officers elected were: Alfred J. Miller, president; Edward Whitehead and V. L. Whitehead, Jr., vice-presidents; G. B. Walker, treasurer, and J. H. Whitehead, secretary.

Irvin F. Lehman, vice-president Blaw-Knox Co., Pittsburgh, recently was chosen president of the Federation of Jewish Philanthropies of Pittsburgh.

Charles A. Butler, for many years with the Crosby Steam Gage & Valve Co., Boston, has opened an office in New York and will act as representative for the J. E. Lonergan Co., Philadelphia, manufacturer of pop safety valves, pressure gages, etc.

H. E. Galvin, second vice-president and manager of the Buffalo office, Ogden R. Adams Co., Inc., has resigned, and will become associated with Crane-Schiefer-Owens, Inc., as sales engineer in the Buffalo office, effective Feb. 1.

W. C. Chancellor, department superintendent of the Ellwood works, National Tube Co., Ellwood City, Pa., was the speaker at the annual meeting of the Steel Works Section, Engineers' Society of Western Pennsylvania, at the William Penn Hotel, on the evening of Jan. 29. His subject was "Manufacture and Use of Seamless Tubing."

D. C. Morrow, vice-president United Iron Works, Kansas City, Mo., has been elected president to succeed the late C. H. Cole. J. H. Campbell has been elected vice-president and treasurer and T. R. Stokes continues as secretary.

Joseph V. Santry, formerly vice-president American Sales Co., subsidiary of the International Combustion Engineering Corporation, has been elected president, succeeding George E. Learnard, who becomes chairman. John Van Brunt, chief engineer for ten years past, was made vice-president in general charge of engineering. Carl S. Reed of the subsidiary General Equipment Co. was elected vice-president and George P. Jackson, chief engineer.

Practically every department of the plant of the Algoma Steel Corporation, Sault Ste. Marie, Ont., is now in operation. On Jan. 21 the 12-in. mill of the merchant mill of the company started work after having been closed down since last September; it is running on bars for the Ford Motor Co. On Jan. 22 the 18-in. mill resumed operations after being out of commission since last October, and is running on tie plates for the Canadian National Railways. The rail mill, which started rolling on Jan. 14, is turning out 100-lb. rails for the Canadian National Railways, for the Eastern lines of the Grand Trunk. Two blast furnaces are blowing and it is stated that a third stack will go in about the middle of February.

Forty steel vessels, comprising 152,000 gross tons, were built in American yards in 1923. This represents only 4 per cent of the peak construction completed immediately after the Armistice. All craft built last year were for Great Lakes and coastwise service, according to the January bulletin of the American Bureau of Shipping. An analysis shows that most of the coastwise craft were combination cargo and passenger, while those on the lakes were largely for ore traffic. Most of the vessels were steamers.

OBITUARY

DANIEL M. BUCK, metallurgical engineer of the American Sheet & Tin Plate Co., Pittsburgh, a leader in technical research in the iron and steel industry, particularly in connection with corrosion in steel, died suddenly at Vandergrift, Pa., Jan. 23, from what is believed to have been acute indigestion. Mr. Buck made valuable contributions to the solution of the problem of corrosion in steel, and the development of copper-bearing steel may well be credited to him. He was one of the committee which compiled in 1917 the volume, "Relative Value of Different Weights of Tin Coating on Canned Food Containers," a work that has had wide circulation and is recognized as authority on tin coating weights. He was the author of several articles on corrosion in steel and twice read papers before the American Iron and Steel Institute, one in 1920, "Review of the Development of Copper Steel," and one in 1915, "Recent Progress in Corrosion Resistance." He was born in Greenville, Pa., 46 years ago and had been with the American Sheet & Tin Plate Co. for the past 17 years. He was a graduate of the Case School of Applied Science with degrees in both chemistry and metallurgical engineering. He was a member of the American Society for Testing Materials, American Ceramic Society, American Electrochemical Society, American Engineering Standards Committee, American Iron and Steel Institute, Association of American Steel Manufacturers, Institute of Mining and Metallurgical Engineers and National Research Council. Mr. Buck also was a member of the Duquesne Club and University Club of Pittsburgh; Cosmos Club, Washington; Chemists' Club, New York; Pennsylvania Club, New Castle, and of the Masonic fraternity. He leaves his wife, a son, Carl Buck; a stepson, Frederick Campbell, and a daughter.

DANIEL M. BUCK

GEORGE L. MEAD, for the past 18 years district manager of the Pawling & Harnischfeger Co., Milwaukee, crane and machinery manufacturer, died suddenly on Jan. 24, while making a purchase in a Pittsburgh store. Death was attributed to heart disease. Mr. Mead was born in Holcomb, N. Y., 65 years ago and before going to Pittsburgh was located at Columbus, Ohio, for the Pawling & Harnischfeger Co.

EDWARD SAWYER, president Atlantic Insulated Wire & Cable Co., Stamford, Conn., died Jan. 21, at Jekyl Island, Ga., following a short illness. He was born in Dover, N. H., 49 years ago, graduated from Yale in 1898, and early in his career was connected with the American Trading Co., New York. In 1902 he organized and became president of the Atlantic Insulated Wire & Cable Co.

JOHN FINLEY, president Golley & Finley Iron Works, Lima, Ohio, manufacturer of oil well boilers, died Jan. 26. He was a pioneer manufacturer of boilers for the oil well industry in western Pennsylvania.

SIDNEY ROSENFELD, for 25 years a Cleveland foundryman and one of the organizers and vice-president of the Grabler Mfg. Co., of that city, died Jan. 28, aged 50 years.

Fire recently destroyed the plant of the Bellaire Enamel Works, Bellaire, Ohio. Officers of the company announced that the loss probably will be $350,000 upon which there is insurance amounting to $175,000.

Machinery Markets and News of the Works

ORDERS DEVELOP SLOWLY

Many Inquiries Received, but Prospective Buyers Display No Haste

In Some Sections, Notably Chicago, There Is an Actual Slackening Compared with First Half of January

Although machine-tool builders have quoted on enough machine tools this month to give them a very satisfactory volume of business if all of the inquiries develop into orders, the disappointing feature of the situation is that prospective buyers as a rule are showing no haste to place orders.

In some sections of the country, notably at Chicago, there is an actual slackening in buying, and while this may have no real significance it is disappointing to those who had confidently looked for a steady gain in machine-tool sales starting from the first of the year.

A fair volume of business was placed in the first two or three weeks of the month, largely tools that were needed last year, but the purchase of which was postponed until after the inventory period. With these orders out of the way, the development of further business is slow.

Much dependence is placed on prospective railroad business. Many railroad lists are being prepared, according to common report, but it may be weeks or months before these develop into orders. Among the roads which are expected to be buyers in a large way are the Southern, Illinois Central, Rock Island, Burlington, Chesapeake & Ohio and Baltimore & Ohio. Scattered orders for single tools are being received from a number of roads, but there is no large buying.

The National Carbon Co., which recently inquired at Cleveland for 35 machines for its plants at Long Island City, N. Y., and Cleveland, has placed orders with several dealers. The Ford Motor Co. last week bought 12 12- to 16-in. lathes from a Cleveland dealer. The Fageol Motors Co., Oakland, Cal., will build a motor bus plant in northern Ohio, for which about $25,000 worth of machine-shop equipment will be required.

Japanese business has been developing slowly, hence an order for five turret lathes has attracted notice.

An official announcement by the General Electric Co. says that expenditures for plant and equipment this year may outrun those of recent years, the average expenditure being from $15,000,000 to $25,000,000.

New York

NEW YORK, Jan. 29.

The City of New York, Department of Plant and Structures, will soon be a large buyer of machine tools for a new central repair station. Building contracts have been let and the list of machine tools to be bought will probably be issued within a few weeks. Machine-tool business in this territory looks fairly promising but orders in hand so far this month show only a slight gain over December. If a fair percentage of the inquiries on which quotations have been made develops into orders the next month will show a decided improvement over January. The Southern Railway, at Washington, is working on a large list for a new shop, and the list is expected in the trade about Feb. 1. The Pennsylvania Railroad has placed orders for a 7-ft. radial drill and a 1100-lb. steam hammer. The United Fruit Co., at Washington, purchased two forging machines and a bulldozer and some other equipment. A motor truck plant has bought five deep-hole drilling machines.

M. F. Westergren, Inc., 213 East 144th Street, New York, operating a sheet metal works, will take bids about Feb. 1 for a four-story plant, 28 x 100 ft., on East 140th Street, to cost $40,000. A. E. Cavis, 259 East 138th Street, is architect.

The J. Burhyte Co., 142-44 Liberty Street, Utica, N. Y., plans for the purchase of a 12-in. lathe, drill press and other equipment.

The Navy Purchasing Office, South and Whitehall Streets, New York, will purchase 10,000 boiler gaskets, N. S. A. F. req. 555. Also, 100 storage battery testing outfits.

A five-story automobile service and repair building, 125 x 175 ft., to cost $200,000, will be erected at St. Claire Place and Riverside Drive, New York, by the Estate of Charles H. Read, 2082 Anthony Avenue, for which plans have been drawn by Louis A. Sheinart, 194 Broadway, architect.

The Compania Azucarera Antilla, S. A. (Antilla Sugar Co.), Province of Oriente, Cuba, is disposing of a bond issue of $6,000,000, a portion of the proceeds to be used for the purchase of the mills and property of the Tacajo Sugar Corporation, on adjoining property, and for extensions and equipment. Robert W. Atkins is president.

A manual training department will be installed in the two-story high school to be erected on West Williston Road, Roslyn, L. I., estimated to cost $250,000, for which bids have been called on a general contract. W. B. Tubby, 81 Fulton Street, New York, is architect.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a lumber company in Nicaragua, which plans the construction of an electric generating plant, a wireless station, concrete wharf with hoisting and conveying machinery, and creosoting plant. A definite opportunity exists for the sale of American machinery; reference No. 117879. Also, of a similar enterprise in British Columbia covering the erection of a 10,000 hp. electric power plant by a lumber concern in connection with a mill to cost $1,500,000 with machinery, of which the larger part will be of American manufacture; reference No. 117916.

The Universal Wire Co., Inc., 335 Broadway, New York, has leased a floor in the building at 533-41 Canal Street, for a new works.

The Ludlum Steel Co., Watervliet, N. Y., manufacturer of tool steels, etc., has disposed of a stock issue of $840,000, a portion of the proceeds to be used for extensions. Edwin Corning is president.

The Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and price lists for reforwarding to the American Consulate, Sao Paulo, Brazil, of American woodworking machinery, especially for the manufacture of wheels and spokes, for which an inquiry has been received.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a public service corporation at Queensland, Australia, which is planning the construction of a steam-operated electric generating plant in the coal district, near Brisbane; reference No. 117174.

The National X-Ray Reflector Co., the X-Ray Reflector Co., and the Luminaire Studios, Inc., all at 31 West Forty-sixth Street, New York, manufacturers of indirect lighting

The Crane Market

CONSIDERABLY more activity is in evidence this week than for the past month or two. In pending business, the locomotive crane field is more active than the overhead. The railroads, particularly, are prominent among prospective purchasers, lists being reported from the Baltimore & Ohio, the Erie and the Lehigh Valley. In addition to three 30-ton locomotive cranes, one for Jersey City, one for Sayre, N. Y. and one for Buffalo, N. Y., the Lehigh Valley is receiving bids on a 25-ton, 45-ft. span gantry crane. Among inquirers for cranes is the Engineers Office, Florence, Ala., which is asking for bids on two 150-ton cranes for installation at Muscle Shoals. The Anaconda Copper Mining Co., New York, is said to be receiving bids on a monorail hoist and a 3-ton crane. The General Electric Co., Schenectady, N. Y., has revised its inquiry on the two 100-ton overhead cranes for Pittsfield, Mass., having made slight increases in the speeds of hoists and wheel bases of trucks. In the Pittsburgh district the Jones & Laughlin Steel Corporation closed on five cranes this week. While a large number of cranes will be required in the plan of modernizing the Homestead works of the Carnegie Steel Co., it is considered likely that the company will build its own cranes. Much crane business is pending from companies in the Pittsburgh territory. The McMyler Interstate Co. was low bidder with a price of $19,200 on the revolving steel crane for the United States Engineer's Office, Milwaukee.

Among recent purchases are:

Phœnix Utility Co., 71 Broadway, New York, a 60-ton, 52-ft. span, 4-motor, overhead traveling crane for Salt Lake City, Utah, from the Whiting Corporation.

Todd Shipyard, New York, a 10-ton hand power crane from the Whiting Corporation.

Austin Co., Philadelphia, a 7½-ton electric traveling crane, a 10-ton hand power crane and a 5-ton hand power crane from the Whiting Corporation.

Pullman Co., Chicago, a 7½-ton electric traveling crane for Michigan City, Ind., from the Shaw Electric Crane Co.

Sheffield Foundry Co., Chicago, a 10-ton electric traveling crane from Alfred Box & Co.

Stone & Webster, Boston, a 100-ton, 64-ft. span overhead traveling crane for a power house installation of the Montaup Electric Co. of Fall River, from an Eastern crane builder.

Co-operative Foundry Co., Rochester, N. Y., a 2-ton, 28-ft span, single 1 beam crane from the Shepard Electric Crane & Hoist Co.

International Cement Co., New York, a bucket handling crane with a 3-cu. ft. bucket for Kansas City, Mo., from the Milwaukee Electric Crane & Mfg. Co.

Croton Sand & Gravel Co., Croton, N. Y., a 15-ton, crawl tread locomotive crane from the Brown Hoisting Machinery Co.

Perth Amboy Dry Dock Co., Perth Amboy, N. J., a 25-ton locomotive crane from the American Hoist & Derrick Co.

T. I. Butler Co., San Francisco, Cal., a 25-ton locomotive crane from the American Hoist & Derrick Co.

Lock Joint Pipe Co., East Orange, N. J., a 10-ton crawl tread crane from the American Hoist & Derrick Co.

Jones & Laughlin Steel Corporation, Pittsburgh, two 20-ton, 75-ft. span, 3-motor, overhead cranes for billet storage yard, Southside works, from the Morgan Engineering Co. and one 7½-ton, a 10-ton and a 15-ton, all double trolley, 5-motor cranes for the Pittsburgh warehouse from the Alliance Machine Co.

Easton Structural Steel Co., New York, a 5-ton and a 10-ton, 60-ft. span, 3-motor, overhead cranes for Easton, Pa., from the Whiting Corporation.

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systems and equipment, reflectors, etc., have been consolidated under the name of Curtis Lighting, Inc., headed by Augustus D. Curtis, who has been associated with the first noted company for about twenty years. A six-story plant is being completed at 1119 West Jackson Boulevard, Chicago, and will be used for increase in production. Headquarters will be at this location.

The Adirondack Power & Light Co., 511 State Street, Schenectady, N. Y., has disposed of a bond issue of $800,000, a portion of the proceeds to be used for an electric generating plant at Cranesville, N. Y., and for other extensions.

The Government of Queensland, Brisbane, Australia, has approved plans for an irrigation project on the Dawson River, extending into New South Wales, estimated to cost $6,000,000, including a hydroelectric generating plant and transmission system, representing approximately $1,000,000.

The Merchants Refrigerating Co., 161 Chambers Street, New York, will commence the construction of a 16-story cold storage plant, 75 x 108 ft., at North Moore and Varick Streets, estimated to cost $400,000, for which plans have been drawn by John B. Snook Sons, 52 Vesey Street, architects.

The Standard Electric Novelty Co., 324 Lafayette Street, New York, has leased four floors in the building at 19 Bond Street for extensions.

J. Irving Walsh, 73 West Eleventh Street, New York, will erect a two-story automobile service and repair building, 78 x 120 ft., at 530 West Street, estimated to cost $90,000. Frederick Savignano, 6005 Fourteenth Avenue, Brooklyn, is architect.

The Stewart-Warner Speedometer Corporation, 1828 Diversey Parkway, Chicago, is reported to be concluding negotiations for the purchase of Jones Speedometer, Inc., 296 Madison Avenue, New York, a subsidiary of Johns-Manville, Inc., and will consolidate the business and plant with its organization.

Punches, shears, lathes, presses and other machine tools at the plant of the Hamilton & Chambers Co., 221 Greenpoint Avenue, Brooklyn, manufacturer of structural steel and iron products, will be offered at a public sale, Feb. 7, including power equipment, motors, motor-generator set, etc.

Ovens, power equipment, conveying and other machinery will be installed in the new plant, 112 x 135 ft., to be erected by the Reitze Model Bakery, Inc., 717 Mattison Avenue, Asbury Park, N. J., for which plans are being drawn by the McCormick Co., Inc., 121-27 South Negley Avenue, Pittsburgh, architect.

The Pencil Exchange, Inc., 67 Fleet Street, Jersey City, N. J., has awarded a general contract to De Riso Bros., Inc., West Hoboken, N. J., for a three-story addition, 30 x 50 ft., to cost $40,000. Alfred W. Baecht, 62 Hopkins Avenue, is architect.

The Magnum Rubber Products Co., Garfield, N. J., has acquired the former plant of the Stanwood Rubber Co., defunct, Elizabeth, N. J. Immediate possession will be taken and machinery installed for the manufacture of tires and other rubber products, to give employment to about 400.

Pumping machinery and other power equipment will be installed in connection with a new reservoir and water plant at Wanaque, for the City Commission, Newark, estimated to cost $18,000,000. The project will be carried out by the North Jersey District Water Supply Commission, 20 Clinton Street, which has instructed its engineering department to prepare plans.

Fire, Jan. 24, destroyed two of the four buildings forming the plant of the Otto Bernz Co., Inc., 17-31 Ashland Street, Newark, manufacturer of plumbers' and other tools, with loss estimated at $100,000 including equipment. It is planned to rebuild.

The Common Council, Maple Shade, N. J., has purchased a site for the construction of an electrically-operated pumping plant for the local waterworks. The Chester Township Water Department is in charge.

The Buckley-Maslin Machine Co., care of J. E. Murphy, 115 Broadway, New York, has been incorporated with capital of 100 shares of stock, no par value, to engage in cylinder regrinding, having taken over the machine shop of the P. J. Durham Co. It is in the market for a crank shaft grinder. Joseph S. Buckley is president and H. A. Maslin, treasurer.

Philadelphia

PHILADELPHIA, Jan. 28.

THE Atwater Kent Mfg. Works, Inc., 4937 Stenton Avenue, Philadelphia, manufacturer of wireless and electrical instruments, etc., is having plans drawn by the Ballinger Co., Twelfth and Chestnut Streets, architect, for its proposed plant on Abbottsford Road and Wissahickon Avenue, and bids will be called at once. It will cost $150,000.

C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, has inquiries out for a turbo-generator set, 750 to 1000 kw. capacity, three-phase, 60 cycle, 2300 volts, with or without surface condenser; also for one air compressor, 2000 to 2600 cu. ft. capacity, 106 lb. pressure, with or without direct-connected or belted motor.

The Board of Trustees, University of Pennsylvania, Thirty-fourth Street, Philadelphia, is having plans drawn

for a new power plant on the Schuylkill River, to cost $100,000. The present station at Thirty-fourth and Spruce Streets will be removed and additional equipment installed. McClellan & Junkersfeld, 45 William Street, New York, are engineers.

The Keystone Roller Bearing Co., Inc., Fifty-third and Bromall Streets, Philadelphia, has purchased the foundry and site, 98 x 187 ft., at Lancaster Avenue and Fiftieth Street, heretofore held by the Pennsylvania Railroad Co., for $35,000, and will use in connection with its plant.

The Lehigh Coal & Navigation Co., 437 Chestnut Street, Philadelphia, will commence the construction of a steel coal breaker at its properties at Lansford, Pa., with machinery for a capacity of 5000 tons per day, estimated to cost $1,250,000.

The Edgar T. Ward Sons Co., Sixteenth and Indiana Streets, Philadelphia, iron and steel, has disposed of its two-story building at 3022-32 North Sixteenth Street, and three-story building adjoining, to the Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, for $205,000. The new owner will occupy as a factory branch.

The Budd Wheel Co., Twenty-third and Westmoreland Streets, Philadelphia, manufacture of steel wheels for automobiles, has awarded a contract to the Wark Co., 1600 Walnut Street, for a one-story addition to manufacturing buildings.

The Philadelphia & Reading Railway Co., Reading Terminal, Philadelphia, contemplates the construction of a pumping plant at Hamilton, Pa., to replace the station recently partially destroyed by fire.

In addition to its proposed generating plant unit at Ninth and Sansom Streets, Philadelphia, estimated to cost $2,000,000, the Philadelphia Electric Co., Tenth and Chestnut Streets, will build a new power substation on Eleventh Street, and will build additions to its similar plants at Federal and Sixth Streets, and at Race and Fifty- sixth Streets.

The Thomas Maddock's Sons Co., Ewing Street, Trenton, N. J., manufacturer of sanitary ware, has engaged W. E. S. Dyer, Land Title Building, Philadelphia, engineer, to prepare plans for its new works in Hamilton Township. It will total 450 x 1600 ft., with power house estimated to cost $750,000 with machinery. A. M. Maddock is president.

The John Wood Mfg. Co., Conshohocken, Pa., manufacturer of boilers, tanks, etc., has acquired the range boiler division plant and business of the L. Wolff Mfg. Co., 225 North Hoyne Avenue, Chicago, and will take immediate possession. It will be operated as a separate branch for Western business. David Ramsey, Jr., treasurer of the purchasing company, will act as a general manager of the Chicago works.

New interests have taken over the management of the Davies & Thomas Co., Tenth and Union Streets, Catasauqua, Pa., manufacturer of iron and steel castings, etc., and will expand the business.

W. T. Matthews, Paoli, Pa., will commence the construction of a two-story automobile service and repair building, 60 x 115 ft., with machine shop, to cost $60,000.

The West Chester Steel Products Co., West Chester, Pa., recently organized by Charles B. Fairweather, formerly connected with the Downington Iron Co., Downington, Pa., has acquired the building of the West Chester Railway Co., at Lenape, and will remodel for the manufacture of manhole covers, special flange connections and miscellaneous steel work.

A manual training department will be installed in the three-story and basement high school to be erected at Annville, Pa., estimated to cost $115,000, for which bids will be asked on revised plans early in February. Edward Z. School, 136 Robeson Street, Reading, Pa., is architect.

The Metropolitan Power Co., Middletown, Pa., a subsidiary of the Metropolitan Edison Co., Reading, Pa., has superstructure work in progress on its generating plant on the Susquehanna River and will commence the installation of machinery before the close of February, including generators, boilers, pumps, one 100-ton capacity electric traveling crane and miscellaneous apparatus. It will have an initial output of 30,000 kw., to be increased later to 200,000 kw. The company is operated by W. S. Barstow & Co., Inc., 50 Pine Street, New York, engineer.

The Pennsylvania Engineering Works, Inc., New Castle, Pa., manufacturer of iron and steel castings, etc., is planning for extensions and installation of additional equipment. The capital has been increased from $1,000,000 to $1,300,000 for expansion. E. W. Beadel is president and J. K. Frust, vice-president.

The Pennsylvania Power & Light Co., Allentown, Pa., has been granted permission to build a hydroelectric generating plant on Wallenpaupack Creek, near Wilsonville, Pa., to cost $650,000. The company has purchased the plant and system of the Benton Electric Light Co., Benton, Pa., and will make extensions in this section. A steel tower transmission line will be constructed on the Sunbury-Selinsgrove highway.

The Federal Refractories Co., Rockefeller Building, Cleveland, with plant at Alexandria, Pa., has closed a contract with the State for gainster rock production in Huntingdon County forest reserves, and will establish a mining plant, with power house, for early operations.

James C. & William Ollard, manufacturers at 213 East Fifth Street, Chester, Pa., are in the market for small, light wall, open-seam tubing, and desire to find a source of supply.

The Link-Belt Co., Philadelphia, announces a reduction in price of its "Cub" portable loader to $485. This machine once sold for $700, but improved production methods, the company states, have made it possible to bring down the price gradually to the present basis.

New England

BOSTON, Jan. 28.

MACHINE tool dealers experienced another lull in business the past week. Sales of new equipment were few, and in used equipment were confined to machines costing $100 to $250 each. Nothing new has developed in inquiries issued this month or those held over from last year and indications are that buyers will take their time in making purchases. While some bright industrial spots are evident, manufacturers collectively are less busy than in several months and state new business is developing slowly.

Employment bureaus report a surplus of mechanics in the labor market, showing an increase each week since Jan. 1. Vermont manufacturers apparently have less interest in machine tools than those in any other New England state. The Providence machine tool market, which depends to a large degree upon the textile mills for business, is another dull spot in this territory. The machine tool trade is depending largely on Massachusetts and Maine for immediate and future business.

The New England Fuel & Transportation Co., Beacham Street, Everett, Mass., has completed foundations for a two-story, 17 x 42 ft. coke breeze screening plant, for which conveying machinery will be required.

Plans will be ready about March 1 for figures on a proposed three-story, 50 x 120 x 50 ft. trade school for Boston, Roxbury district. Thomas P. Glynn, chairman, schoolhouse commission is in charge of details. McLaughlin & Burr, 88 Tremont Street, Boston, are the architects.

Foundations are in for a one-story, 140 x 142 ft. manufacturing unit on Cambridge, Market and Clark Streets to cost approximately $14,000, for the Barbour-Stockwell Co., 205 Broadway, Cambridge, Mass., railroad equipment, etc.

Roscoe W. Wilbur, Hubbardston, Mass., has purchased the plant of the Banigan Mfg. Co., Elmville, Conn., recently damaged by fire. After repairs it is proposed to manufacture wire nails. Valuable water-power is on the property.

The Cumberland County Power & Light Co., Portland, Me., will erect a $1,250,000 addition to its Knightville steam power plant, which will be increased from 10,000 kw. to 22,500 kw.

Early next month the Ordway-Robinson Co., Inc., bundle fasteners, will take over the former Burke plant at Marlboro, Mass. Mrs. Virginia Robinson is president, Edward B. Hill, treasurer and Dana A. Ordway, secretary. The company's product consists of various lengths of wire chain and a patented clasp.

The Southington Steel & Iron Co., Southington, Conn., has completed financing making it possible to proceed with plans for taking over and equipping the former plant of the Aetna Nut Co.

The foundry heretofore operated by the Parsons Machinery Co., Marlboro, Mass., leather machinery, hereafter will be operated as an independent company under the name of the Marlboro Foundry Co. The Parsons company will continue to operate its machine and die press shops.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has plans for a two and four-story motor truck and implement service building on North Beacon Street, Brighton, Boston, totaling 100,000 sq. ft., to cost about $55,000. Work will commence in the spring.

N. H. Haronian, Providence, R. I., manufacturing jeweler, has purchased property on Manucentre Street, totaling 12,000 sq. ft., as a site for a new plant to cost $45,000, with precision and other machinery.

The Marcus Mason Machine Co., Union Street, Worcester, Mass., has removed its plant to Westboro, Mass., where additional equipment will be provided for larger output.

The National Can Co., 36 North Washington Street, Boston, has revised plans for a one-story and basement factory, 125 x 160 ft., at Dorchester, estimated to cost $150,000 with equipment. Krokyn & Brown, 7 State Street, are architects.

The Hygienic Ice Co., New Haven, Conn., will build an addition to its ice-manufacturing plant. Bonds for $200,000 will be sold, a portion of the fund to be used for the expansion.

The Cumberland County Power & Light Co., 453 Congress Street, Portland, Me., has plans for an addition to its steam-operated electric generating plant at Knightville, Me., to cost $1,000,000.

The Hartford Stove Repair Co., 94 Morgan Street, Hartford, Conn., has plans for a two-story works to cost $42,000. Berenson & Moses, 30 Allyn Street, are architects.

The Lowell Electric Light Corporation, Lowell, Mass., is arranging an extension program, and the installation of additional power plant equipment. To carry out the work, a portion of a stock issue of $716,400 now being arranged will be utilized.

Cleveland

CLEVELAND, Jan. 28.

MACHINE tool business continues in fairly good volume but sales are still confined largely to single tools. The National Carbon Co., which recently inquired for about 35 machines for its Cleveland and Long Island plants, has lined up its equipment, dividing it among several distributors and orders are expected to be placed in a few days. The Ford Motor Co. continues to buy additional equipment and during the week purchased 12 12 to 16-in. lathes from a Cleveland dealer. A Japanese order for five turret lathes was placed the past week with a local manufacturer who also received an order from the Nash Motor Co. for four machines. This company has booked orders for about 175 machines this month, but they were mostly small machines for secondary operations or for working in brass. The Fageol Motors Co., Oakland, Cal., builder of motor busses, will erect a plant in northern Ohio and will purchase $25,000 worth of equipment, largely woodworking tools.

Some inquiry is pending for cranes, ore handling and coal oven equipment. The Donner Steel Co., Buffalo, has an inquiry out for an ore bridge to replace one blown down a few days ago.

The Fageol Motors Co., Oakland, Cal., manufacturer of motor busses will equip another plant either in Cleveland or Akron, Ohio, and will purchase about $25,000 worth of machinery, mostly woodworking tools for the manufacture of bus bodies. A machine shop and assembling department will also be provided. It has established Ohio headquarters in the Bulkley Building, Cleveland, in charge of Gordon Lee, treasurer.

The Kirk-Latty Mfg. Co., Cleveland, recently disposed of its wheel goods department to the Topliff-Ely Co., Washington, Pa., and will hereafter devote its entire activities to the manufacture of its line of bolts and nuts. The removal of the wheel goods department has made available considerable additional factory space and the company is largely increasing its bolt and nut making capacity.

The Star Equipment Co., Findlay, Ohio, is equipping a plant for the manufacture of steel parts for coal and ash handling equipment.

The Industrial Steel Casting Co., Millard Avenue and Front Street, Toledo, is building a 102-ft. foundry extension.

J. Edward Strader, Forest Hill Building, Euclid and Superior Avenues, East Cleveland, is building a plant for the manufacture of penetrating graphite oil for removing rusty nuts and bolts, lubricating automobile springs and as an anti-rust coating on steel.

The city of Canton, Ohio, has completed plans for a $600,000 extension to its sewage disposal plant. Pumps and other equipment will be required. McClaskey & Reese, Valentine Theater Building, Canton, are the engineers.

Owen Brothers, Lima, Ohio, manufacturers of automobile bodies, are planning a one-story addition, 20 x 40 ft.

The Eaton Axle & Spring Co., Cleveland, will shortly begin the erection of a building, 60 x 290 ft. for warehouse purposes.

The Ohio State Stove & Mfg. Co., Columbus, Ohio, contemplates the erection of two additions, 32 x 90 ft. at an estimated cost of $20,000 each. Motors and other equipment will be required.

The Smith Facing & Supply Co., 1857 Carter Road, Cleveland, manufacturer of foundry supplies, has awarded contract for one-story and basement factory, 35 x 96 ft.

The Ashtabula Water Supply Co., Ashtabula, Ohio, is preparing plans and specifications for a $150,000 addition to its filtration plant. J. N. Chester, Union Bank Building, Pittsburgh, is the consulting engineer.

The Akron Cabinet Works, 570 South High Street, Akron, Ohio, is in the market for a swing cut off saw and shaper.

The Buerger Iron Works Co., Firestone Park, Akron, Ohio, is contemplating the installation of a shaper and a lathe. M. Miller is the purchasing agent.

T. P. Howland, operating a forge shop at 858 High Street, Akron, will install some new equipment, including blower, drill press and a 4-hp. electric motor.

Romig Brothers, 884 High Street, Akron, operating a garage and service station is planning the installation of a number of machine tools, to include drill press, cylinder reboring machine, grinder, etc.

Electrical pumping machinery and equipment will be required in the new sewage disposal plant to be built at Wadsworth, Ohio, to cost $100,000. The Town Council is in charge.

Cincinnati

CINCINNATI, Jan. 28.

WHILE there was no feature in machine tool buying the past week, orders continued regularly and the month of January will show a substantial increase in sales over December. Inquiries are still large and when railroad purchasing begins, which is expected shortly, the machine tool industry will undoubtedly show a substantial increase in operations. Used machinery is moving fairly well, particularly small tools. The Chesapeake & Ohio is reported to be preparing a substantial list and the Baltimore & Ohio is also expected to come into the market for equipment.

Some of the larger purchases during the week were made for Eastern points, the General Electric Co. having placed orders for part of its requirements for West Philadelphia, and a Philadelphia body building plant closed for planers and drilling machines. Orders were also received from automobile and parts manufacturers. The Shipping Board is understood to be ready to issue a list of engine lathes required for various sections of the country. Several inquiries from France are being figured on, as well as a number from South American countries.

Sale of the plant and equipment of the Monitor Stove & Range Co., Cincinnati, to a new corporation, the Monitor Realty Co., has been approved and the Realty company will lease the plant to the Monitor Furnace Co. The plant and equipment sold for $500,000, or $90,000 more than two-thirds of the appraised value.

The Mead Paper Co., Chillicothe, Ohio, will in the spring erect an addition to its plant and install some new machinery. The company states that in order to take care of increased business it has been necessary to operate overtime and on Sundays. George H. Mead is president.

The plant of the National Fireproofing Co., Hobart, Ind., manufacturer of roofing and terra cotta, was damaged by fire Jan. 25. The manufacturing rooms and machine shops were completely destroyed, with loss estimated at $500,000.

The plant of the Robert Mitchell Furniture Co., Cincinnati, was destroyed by fire Jan. 23, the loss estimated

at $100,000. The company will rebuild at once and will be in the market for wood-working machinery. Robert Mitchell is president.

Electrical and pumping machinery and equipment will be required in the additions contemplated at Jackson, Tenn., to the city water-works, estimated to cost $100,000. S. Lancaster, Jackson, is the engineer in charge.

The Starrick Auto Repair Co., 304 South Jefferson Street, Dayton, Ohio, has acquired additional property for a one-story machine and repair plant estimated to cost $25,000. W. L. Starrick is head.

The Hickory Mining Co., Mineral City, Ohio, will erect a brick manufacturing plant and power house on the Lindentree Road, estimated to cost $80,000.

The Southern Railway Co., Cincinnati, has awarded a general contract to John P. Pettyjohn & Co., Lynchburg, Va., for its proposed car repair shop at Ferguson, Ky., to cost approximately $80,000.

The Memphis Power & Light Co., Memphis, Tenn., is disposing of a preferred stock issue of $970,000, a portion of the proceeds to be used for extensions and improvements in power plants.

The Tennessee Roofing Tile Co., Knoxville, Tenn., formerly the Knoxville Roof, Tile & Concrete Co., is planning for the establishment of two new works at Memphis and Chattanooga, Tenn. Dr. M. M. Copenhaver, Knoxville, is president.

The Wheeling Steel Corporation, Wheeling, W. Va., has acquired two acres of waterfront property at Memphis, Tenn., and plans the construction of ore docks, warehouses and auxiliary structures estimated to cost $250,000. Traveling cranes, conveying machinery and other material-handling equipment will be installed.

The Union Gas & Electric Co., Cincinnati, is arranging a preferred stock issue of $4,254,000, a large portion of the proceeds to be used for initial work in connection with its proposed steam-operated electric generating plant on the Big Miami River, with ultimate cost placed at $10,000,000.

The Broadway Market & Auditorium Co., Knoxville, Tenn., plans for the installation of a cold storage and refrigerating plant at its new market building, 125 x 300 ft., estimated to cost $200,000. J. L. Humphreys is president and general manager.

Bids will be received until Feb. 7 by E. E. Person, recorder, Gallatin, Tenn., for four centrifugal pumps, motors and auxiliary equipment for the municipal water-works. B. M. Klyce, Fourth and First National Bank Building, Nashville, Tenn., is architect.

St. Louis

ST. LOUIS, Jan. 28.

OLIVER J. POPP, Odd Fellows Building, St. Louis, architect, has plans for a two-story factory at Forest Park Boulevard and Boyle Avenue, 80 x 180 ft., for the manufacture of measuring machines, etc., for a company whose name is temporarily withheld. It will cost about $50,000.

The Allied Refining Co., Okmulgee, Okla., has tentative plans for a new unit for the production of lubricating oils, estimated to cost $150,000 with machinery. It is purposed to increase the output to 2500 bbl. per day.

The Common Council, Apperson, Okla., will install a pumping plant, with electric-operated triplex pumps in connection with its proposed waterworks system, estimated to cost $75,000.

The Fort Smith Spadra Coal Co., Fort Smith, Ark., recently organized, plans the installation of electric power equipment and mining machinery near Hartman, Ark. W. D Logue heads the company.

The Polar Wave Ice Co., 3626 Olive Street, St. Louis, has awarded a general contract to Bell Brothers, Moberly, Mo., for the erection of a new plant estimated to cost $60,000.

The North American Light & Power Co., Illinois Merchants' Bank Building, Chicago, is perfecting plans for additions in its Cahokia generating plant, near St. Louis, estimated to cost approximately $20,000,000.

Manual training equipment will be installed in the two-story high school to be erected at Yates Center, Kan., estimated to cost $100,000, for which bids are being received on a general contract until Feb. 4. Washburn & Stokey, Washburn Building, Ottawa, Kan., are architects.

The Crystal Ice & Fuel Co., Independence, Kan., is contemplating the erection of a one-story ice-manufacturing plant, 60 x 105 ft., estimated to cost $55,000. A second story will be built later. A. B. Shaffer is general manager.

The Union Electric Light & Power Co., St. Louis, is arranging for a bond issue of $10,000,000, a portion of the proceeds to be used for extensions in electric generating plants and system.

The Rialto Mining Co., Joplin, Mo., is considering the installation of a large air compressor at its mill and auxiliary equipment. S. G. Ash is superintendent.

The Public Service Co., 107 East Fourth Street, Tulsa, Okla., has plans for a one-story addition to its ice-manufacturing and refrigerating plant, 105 x 135 ft., to cost about $200,000, of which approximately $150,000 will be used for equipment. Atkinson & Olston, Mid-Continent Building, are architects.

The City Council, Kansas City, Kan., Howard Payne, city clerk, is planning an early call for bids for electric-operated pumping machinery, including one 10-in. and four 20-in. vertical pumps, with motors, and one 60-hp. motor for horizontal pumping unit, with chain drive and control.

Fire, Jan. 17, destroyed a portion of the refinery and tank storage of the Lion Oil & Refining Co., El Dorado, Ark., with loss estimated at $50,000. It is planned to rebuild.

A power house and air compressor plant will be constructed at the proposed carbon black plant to be erected by B. F. Reeves, Little Rock, Ark., and associates, estimated to cost $350,000 with machinery. John F. Streepy, local attorney, is representative for the new company which is being organized.

The Hammer Iron Works, Fort Smith, Ark., will construct a new plant double the size of its present shop at 207 South Sixth Street, to cost $25,000 including equipment. The new building will occupy a lot across the street from the present location, and its dimensions will be 55 x 150 ft. An electric crane, an hydraulic press and several machine tools will be added to the equipment. The present plant will be used for light work.

The Overland Sheet Metal & Furnace Co., Overland, Mo., organized to manufacture metal specialties, is inquiring for tinners' tools and sheet-metal working machinery. H. E. Grossenbacher is manager.

Detroit

DETROIT, Jan. 28.

THE Superior Sand & Gravel Co., Dime Bank Building, Detroit, will erect a new plant at 431 Lycaste Street, to cost $35,000 including conveying, screening and other equipment.

The Inland Automobile Co., Flint, Mich., plans for enlargements and the installation of additional equipment. A portion of a stock issue of $400,000, recently arranged, will be used for the expansion.

Manual training equipment will be installed in the new three-story school to be erected at Flint, Mich., estimated to cost $750,000, for which bids will soon be asked on a general contract. Malcomson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

The Detroit Edison Co., 2000 Second Street, Detroit, has called a special meeting of stockholders Feb. 4 to arrange an increase in capital stock from $60,000,000 to $85,000,000, a portion of the proceeds to be used for extensions in generating plants and system.

Manual training equipment will be installed in the two-story junior high school to be erected at Alma, Mich., estimated to cost $250,000, for which plans are being prepared by Lane, Davenport & Peterson, 1017 Charlevoix Building, Detroit, architects.

The Toney Motor Co., Princeton, Ind., is planning to purchase tools for its machine repair shop to replace machinery recently destroyed by fire, including a cylinder grinder, reboring machine, drill press, lathe and small tools. B. D. Toney is head of the company.

The Michigan Screw Co., Lansing, Mich., has established a new department for sherardizing work, and plans to advance equipment and production in this branch.

The United Brass & Aluminum Co., Port Huron, Mich., is arranging a program for expansion during the year in the line of brass, aluminuum and iron castings, and will increase the capacity about 30 per cent.

H. S. Graves, Huron, Mich., is planning to purchase equipment for installation in a local building to manufacture fire extinguishing apparatus, including lathes, milling machine, small tools, etc.

The Wolverine Bumper & Specialty Co., Grand Rapids, Mich., is planning to consolidate its several works in the new plant now in course of erection at 1905 Broadway, and will install additional equipment.

The Erie Railroad plans the construction of locomotive and car shops and a power house at Hammond, Ind., to cost approximately $500,000. A coal hopper with mechanical loading equipment will also be built.

Chicago

CHICAGO, Jan. 28.

ACTIVITY in machine tools has slackened perceptibly and although considerable business is still pending, current orders are confined principally to single machines. The Automatic Electric Co., Chicago, has closed for a 14-in. x 6-ft. engine lathe and 10 light milling machines, in addition to its purchases recently reported. The Pettibone-Mulliken Co., Chicago, has bought a 3000-lb. steam hammer. The Buda Co., Chicago, has closed for a hand milling machine and is about to buy a frog and switch planer. The Nash Motors Co., Kenosha, Wis., has ordered a 4-spindle gang drill. Lawrence Brothers, Sterling, Ill., have placed an order for a 20-in. crank shaper. The Sullivan Machinery Co., Michigan City, Ind., is in the market for a horizontal boring mill with a 4 or 4½-in. bar.

Among the railroads, the Santa Fe will probably be the first to buy, having prepared an extensive list which is about to be issued. The Illinois Central, Rock Island and Burlington are also at work on their machine tool programs, but it may be some time before actual inquiries are put out. The only railroad buying of the past week was the purchase by the Burlington of a few tools left over from its 1923 budget.

The Chicago Board of Education has issued the following list of wood-working equipment for the Hoyne Continuation School:

One portable band saw equal to No. 192 Oliver, 18 in., with direct-connected ½-hp. motor, using 220-volt d. c.
One portable universal saw equal to Wallace's 7-in., with direct-connected ½-hp. motor arranged for 220-volt d. c.
One portable hand planer and jointer equal to Oliver 6-in., with direct-connected ½-hp. motor arranged for 220-volt d. c.
One portable motor driven disk sander equal to Oliver No. 182, 15-in., with direct-connected ½-hp. motor arranged for 220-volt d. c.
One oilstone tool grinder equal to Oliver No. 585, with direct-connected ½-hp. motor, 220-volt d. c.
One portable hollow chisel mortiser with direct-connected ½-hp. motor, 220-volt d. c.
Two electric glue pots with automatic heat control and one-quart capacity, complete with switch and cord.

The Whiting Corporation, Harvey, Ill., has booked the following orders for foundry equipment: Two batteries of four 42 x 56-in. tumbling barrels for the Crane Co., Chicago; two No. 7 cupolas for the Carbon Steel Castings Co., Lancaster, Pa.; one No. 3½ cupola for the Indiana State Reformatory, Pendleton, Ind.; one No. 7 cupola for the Haynes-Langenberg Mfg. Co., St. Louis; one No. 4 cupola for the Craig Foundry Co., Brooklyn, N. Y.; four No. 8 cupolas for the Ford Motor Co., Detroit; one No. 2½ cupola for the W. H. Cain Gas Radiator Co., Los Angeles.

The American Printers Roller & Composition Mfg. Co., 1322 North Halsted Street, Chicago, has awarded contracts for remodeling its two and three-story plant, 90 x 125 ft., at a cost of $40,000.

J. Smith, 1263 North Paulina Street, Chicago, has awarded contract for a one-story automobile body shop, at 1614-16 West North Avenue, to cost $10,000.

The Vaughan Novelty Mfg. Co., 3211-25 Carroll Avenue, Chicago, is erecting a one-story addition, 50 x 150 ft., to cost $10,000.

The Ashton Equipment Co., manufacturer of post office equipment, 159 North State Street, Chicago, expects to complete a new plant at Watervliet, Mich., by March 1.

The Northern Pacific Railway has prepared plans for repair shops and a power house at Brainerd, Minn., to cost approximately $600,000 including equipment.

The Hedman Mfg. Co., 28 East Huron Street, Chicago, manufacturer of check protecting devices, is erecting a three-story factory at 1158-64 Center Street, to cost $105,000.

The body and assembly plant of the Ford Motor Co. at Hegewisch, Ill., has been completed and will begin operations about Feb. 1. At the outset, 4000 will be employed and the payroll is expected ultimately to reach 16,000. Construction work has been in progress for a year.

The Commanding Officer, Rock Island Arsenal, Rock Island, Ill., will take bids until Feb. 6, for one gasoline-operated engine complete, circular O-AP 35500-A.

Walter Whiteside, 404 Atlas Building, Tulsa, Okla., and associates, are planning the construction of a hydroelectric power house on the Cloquet River, near Duluth, Minn.

The Great Western Sugar Co., Sugar Building, Denver, Colo., is disposing of a stock issue of $4,032,000, a portion of the proceeds to be used for extensions and improvements in mills, including the installation of additional equipment. W. L. Petrikin is president.

The Common Council, Glencoe, Minn., has tentative plans under advisement for a municipal electric light and power plant to cost $80,000. J. F. Klobe is city clerk.

The Maytag Co., Newton, Iowa, manufacturer of agricultural equipment, washing machines, etc., is perfecting plans for a new foundry. E. H. Maytag is secretary.

Cecil C. Gates, University Place, Neb., city clerk, will take bids until Feb. 15, for two 500 gal. per min. capacity, motor-driven, centrifugal pumps, high lift pumping station and other equipment for a municipal waterworks. Fulton & Letton, Bankers' Life Building, Lincoln, Neb., are engineers.

The Illinois Power Co., Springfield, Ill., is arranging an extension program for the year to involve about $1,200,000, of which approximately $1,000,000 will be used for power station extensions and additional equipment. A. D. Mackine is general manager.

Swift & Co., 76 West Monroe Street, Chicago, are planning the installation of a refrigerating and ice plant at Ishpeming, Mich.

The Common Council, Walthill, Neb., has authorized plans for a municipal electric plant and will take bids early in the spring. It will cost close to $35,000. The Prince-Nixon Engineering Co., Peters Trust Building, Omaha, Neb., is engineer.

The Detroit Copper & Brass Rolling Mills, 111 North Jefferson Street, Chicago, has plans for a new one and two-story building, 50 x 195 ft., at Washington and Ada Streets, to cost $100,000, for which foundations will soon be laid. Francis A. Dibelka, 2743 West Twenty-second Street, is architect.

The Crown Die & Tool Co., 555 West Monroe Street, Chicago, has taken bids on a general contract for a one-story machine shop, 70 x 125 ft., to cost $32,000. James W. Barrett is president.

Pittsburgh

PITTSBURGH, Jan. 28.

CHIEF satisfaction in the local machine tool trade is in the amount of business pending rather than in sales, although the past week has seen some improvement in that direction. The trade is looking for awards, probably late this week, against the Standard Sanitary Mfg. Co. list for its Baltimore plant, and action on the Westinghouse Electric & Mfg. Co. list is likely soon after the tabulation of bids is completed. A large double-end shear to serve the billet yard at the Southside works of the Jones & Laughlin Steel Corporation also appears among the prospects for early purchase.

Considerable encouragement is given by the recent announcement of plant rehabilitation by the United States Steel Corporation. While this development does not mean business in machine tools, the fact that such a large interest has decided to go ahead with improvements, which long have been under consideration, is considered likely to have a reaction upon those who have been planning changes and plant betterments which include machine tool purchases. Inquiry for tools still is reported as brisk by most of the local trade and the placing of only a portion of the pending business will mean a satisfactory year.

The past week the Timken Roller Bearing Co., Canton, Ohio, placed with the Mackintosh-Hemphill Co., Pittsburgh a 35-in. 3-high blooming mill, together with tables, scissors and other auxiliary equipment. The American Sheet & Tin Plate Co., closed with the same company for a large sheet bar shear for its Vandergrift, Pa., works. Betterments at the Homestead works of the Carnegie Steel Co., are believed to mean the replacement of some somewhat obsolete structural mills and orders for new type units. The Jones & Laughlin Steel Corporation, it is reported, is considering placing the new bar mill, originally planned for its Southside works, at its Aliquippa plant.

The Mount Shasta Power Corporation, a subsidiary of the Pacific Gas & Electric Co. has placed with the Westinghouse Electric & Mfg. Co. an order for 10 8000 kva. transformers and 5 circuit breakers for 220,000 volt. The transformers are designed to step down from 220,000 volts to 11,000 volts. This is claimed to be the highest voltage that

has yet been attempted for power transmission. Special taps will be provided for operation at a lower voltage at the time of installation, but as the load on the line increases the transformers will be connected for 220,000 volts.

Contract has been let by the Pittsburgh Screw & Bolt Co., Preble Avenue, Pittsburgh, for a one-story addition to cost approximately $75,000, with equipment.

The R. S. Altman Coal Co., Lincoln Highway, Jeannette, Pa., is planning to rebuild the portion of its tipple destroyed by fire Jan. 24. It will also install additional operating equipment to replace former machinery.

The Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has purchased the plant and property of the Johnetta Brick & Coal Co., Johnetta, Armstrong County, comprising a plant and about 4000 acres of coal lands, for $400,000. Electric power and mining equipment will be installed. The output of the brick plant will be used for additional buildings at different plants of the company in western Pennsylvania.

Fire, Jan. 22, destroyed the automobile service and repair building of the L. H. Rutherford Co., Washington, Pa., with loss estimated at $70,000. It is planned to rebuild.

The Mine Safety Appliance Co., Braddock Avenue, Pittsburgh, has taken bids on revised plans for a four-story and basement addition, 63 x 145 ft., to cost about $95,000. Bernard H. Prack, Keystone Building, is architect.

Fire, Jan. 21, destroyed a portion of the oil refinery of the Atlantic Refining Co., Lawrenceville section, Pittsburgh, with loss reported at $40,000 including equipment. It is planned to rebuild.

The Lafayette Glass Co., Northview, Clarksburg, W. Va., is planning the installation of additional blowing machines and auxiliary equipment. The capital has been increased from $150,000 to $250,000 for expansion.

The Zang-Lesher Co., 5474 Penn Avenue, Pittsburgh, is reported to be planning the erection of a one-story structure 75 x 105 ft., to manufacture automobile tops, frames, etc., to cost about $43,000.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, will have plans drawn for a one-story foundry at its Sharon works, for the casting of transformer housings, to cost about $150,000.

The West Penn Power Co., West Penn Building, Pittsburgh, has plans for a new power house at Latrobe, Pa., estimated to cost $1,000,000, to be connected with the lines of the Penn Public Service Co., Johnstown, Pa. The last noted company is perfecting plans for a merger of 69 utility companies in the northwestern counties of the State, and will make enlargements in power plants and system.

The Iron City Sanitary Mfg. Co., Oliver Building, Pittsburgh, manufacturer of enameled sanitary ware and fixtures, has plans for a one-story addition to its plant at Zelinople, Pa., 90 x 360 ft., estimated to cost $150,000 with equipment. C. A. Fagan is president.

The Dwyer Coal Co., Logan, W. Va., recently organized, is planning the construction of a tipple and the installation of electric power and mining machinery on property recently purchased in the Chapmansville section. John G. Dwyer is president, and J. W. Dwyer, secretary and treasurer.

H. H. Brackman, Pittsburgh, will commence the erection of a one-story machine shop at 709-13 Fulton Street, to cost about $20,000 with equipment.

Murphy Brothers, 32 North Park Row, Erie, Pa., manufacturers of sheet metal products, roofing, etc., plan the installation of additional equipment, including bending rolls, cutting machines, etc.

The Automatic Mine Door Co., Beckley, W. Va., recently formed with a capital of $200,000, has commenced the erection of a one-story plant at Beckley Junction to cost $55,000, for the production of fireproof mine doors, with automatic operating mechanisms. W. C. Canterberry is secretary.

The Diamond Coal Co., Fairmont, W. Va., has acquired the Hood mining plant of the Rivesville Coal Co., Rivesville, W. Va., and about 1000 acres of coal lands in the Sewickley district, heretofore held by the Edward Hines interests, Chicago. The new owner plans for extensions and will install electric power and other machinery to cost about $150,000.

Fire, Jan. 21, destroyed a portion of the plant of the Buffalo-Erie Tube Co., Erie, Pa., with loss estimated at $42,000. It is planned to rebuild.

A manual training department will be installed in the proposed junior high school to be erected at Coraopolis, Pa., estimated to cost $175,000, for which bids will be received on a general contract until Feb. 15. Edward Stotz, 213 Sixth Avenue, Pittsburgh, is architect.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has acquired a building at Second Avenue and Tenth Street, Wheeling, W. Va., and will remodel and improve for a factory branch at a cost of $100,000. R. E. Jansing is local manager.

The Central Tube Co., First National Bank Building, Pittsburgh, will commence the erection of a brick and steel addition to its plant at Economy, Pa., to cost $50,000.

Milwaukee

MILWAUKEE, Jan. 28.

DEALERS in machine tools report fair business in the general run of equipment, with sales usually in single machines. One of the largest dealers stated January sales already are in excess of the same month in 1923. Tool builders in this market have moderate orders, but are not booking new business in the same volume as they are making deliveries. Foundries and machine shops are receiving increasing orders, which include some with specifications well forward.

The Pawling & Harnischfeger Co., Milwaukee, is taking bids through Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, for the construction and equipment of a steel foundry, 183 x 374 ft., one story, of brick and steel, as an extension of its main works at Thirty-eighth and National Avenues. Arthur G. Henricks is vice-president and general manager.

The Jenkins Machine Co., Sheboygan, Wis., has engaged Edward A. Juul, local architect, to design a gray iron foundry addition, 40 x 75 ft., of steel and hollow tile construction. It manufactures heavy woodworking machinery. A. G. Stuedeman, 315 North Eighth Street, is president.

E. C. Swartout, 904 Rose Street, LaCrosse, Wis., will invest about $60,000 in erecting and equipping a hydro-electric generating plant at West Salem, near LaCrosse. The work is in charge of W. S. Woods, consulting engineer, LaCrosse. Plans have been completed and bids will be taken about Feb. 1 on the building, equipment to be purchased shortly thereafter.

The Hudson Mfg. Co., Minneapolis, manufacturer of agricultural tools and machinery, has decided to abandon its hay tool operation at Janesville, Wis., and on Feb. 1 will consolidate this branch with the works at DePere, Wis. The Janesville plant was acquired about four years ago from the Strickler Hay Tool Co. The shop and office at 225 North Main Street will be disposed of. R. G. Thompson, who has been manager of the Janesville plant, is being transferred to the DePere works, in charge of the hay tool department.

The City Water Commission, Neenah, Wis., is asking bids until Feb. 5 for furnishing the following items for an extension of the municipal water plant: One 200-hp. oil engine, with one 170-kva. generator; one 750-cu. ft. two-stage air compressor and one 125-hp. slip ring motor with starter; one 42-in. x 120-in. receiver tank, and one 15,000-gal. oil storage tank; one air lift pump, and necessary switchboards. Harry S. Zemlock is secretary of the commission.

Arthur Fox, Cornell, Wis., will place contracts after Feb. 1 for the erection and equipment of a $35,000 sales and service building, 100 x 130 ft., one story and part basement.

The Board of Education, Wausau, Wis., will close bids Feb. 15 on the construction of a vocational training addition to the Central high school, 200 x 270 ft., two stories and basement, to cost about $350,000. The contract for the substructure was let some time ago to the Hoeppner & Bartlett Co., Eau Claire, Wis. Shop equipment will not be purchased until April or May. The architects are Oppenhamer & Obel, Wausau and Green Bay, Wis.

The Andrew Kopperud Co., Milwaukee, conducting a forge works at Thirty-eighth Avenue and Lapham Street, has incorporated its business with a capital stock of $100,000. The incorporators are Harry L. Kopperud, Mrs. Julia Kopperud and Stanley R. Kopperud, comprising the present ownership. Additions to shop and equipment are planned.

The Common Council, Tomah, Wis., will ask bids soon for furnishing a 300 gal. per min. centrifugal pump, motor driven, several smaller pumps, and a 50,000 gal. steel tank mounted on a 140-ft. steel tower, for a new 12-in., 500 ft. deep well to be added to the water supply. The work is in charge of W. G. Kirchhoffer, consulting engineer, Madison, Wis.

The Northern Furniture Co., Sheboygan, Wis., will spend about $120,000 in remodeling one of the buildings of its factory group into a manufacturing addition, 65 x 230 ft., four stories, of brick and steel, with steel sash. Equipment is now being purchased. Bids on the construction will be asked shortly by W. C. Weeks, local architect. Edward Hammett is vice-president and general manager.

Otto Klein, for seven years connected with the Vulcan Mfg. Co., iron works, Fond du Lac, Wis., is establishing a

general machinery repair shop specializing in welding, cutting and brazing, at 193-195 Military Street, in the same city.

The Weyer Mfg. Co., 1701 Washington Street, Manitowoc, Wis., manufacturer of coasters, express wagons and similar toy vehicles and novelties, has purchased a site at Twenty-seventh Street and Western Avenue, and will build a new factory, 100 x 120 ft., one story, and remodel a garage, 60 x 120 ft., occupying part of the property for a warehouse and shipping room. The general contract has been let to the E. R. Herman Co., Manitowoc. Considerable new wood and metal-working equipment will be purchased for delivery in May. John Weyer is president and general manager.

The Press Publishing Co., 702 Center Avenue, Sheboygan, Wis., printer and publisher of the Sheboygan *Daily Press-Telegram*, will build a new plant costing about $65,000, including practically a full complement of new presses, motors, typesetting machines, etc., according to plans being drawn by Edward A. Juul, local architect. Bids will be taken about March 1. C. E. Broughton is president and editor.

The Kem-Etta Mfg. Co., Janesville, Wis., has been incorporated with a capital stock of $60,000 to manufacture radio sets, cabinets, end tables and other specialties. The former plant of the Skidd Mfg. Co., Janesville, has been purchased and is being remodeled and equipped with new machinery. The officers and principal owners are E. A. Kemmerer, president, and James Van Etta, secretary-treasurer and general manager.

The Nash Hardware Co., Wisconsin Rapids, Wis., will build a new two-story sheet metal shop, 86 x 110 ft., at First and Grand Avenues, and remodel the present store at Second and Grand Avenues, into a public garage and salesroom, adding an extension at the rear for a machine and service shop, for its automotive department. The total cost of the work, including equipment, is estimated at $75,000. L. M. Nash is president and general manager.

The Appleton, Wis., Board of Public Works is asking bids until Feb. 19, under revised plans by Perkins, Fellows & Hamilton, architects, 814 Tower Court, Chicago, for the erection of two junior high schools and vocational institutes, estimated to cost $250,000 each. Original bids were rejected in December as too high.

The Common Council of Phillips, Wis., has extended from Feb. 1 to Feb. 20 the time of taking bids for equipment for the new city water plant. Principal items are: One 300 gal. per min. centrifugal pump and 440-volt motor; one 1250 gal. per min. centrifugal motor-driven pump, with 150 hp. oil engine standby, and a 100,000 gal. steel tank on a 90-ft. tower. Frank Henry, local engineer, is in charge of the work. Carl F. Scheel is city clerk.

The Rhinelander, Wis., Board of Education, Mrs. Anna Moe, secretary, is taking bids until March 3 for the erection of the first unit of a two-unit junior high and vocational training school to cost $450,000. Plans are by Smith, Brandt & Reynolds, architects, Manitowoc, Wis.

The Topp-Stewart Tractor Co., Clintonville, Wis., has decided to reopen its works and resume regular production of quadruple drive tractors, and will do some retooling as well as making some replacements of equipment.

The Chicago & Northwestern Railroad Co., Chicago, intends to rebuild at once its No. 2 ore dock at Ashland, Wis., which was wrecked by fire on Jan. 12 with damage estimated at more than $2,000,000. The frame structure will be replaced by a concrete and steel dock, electrically operated, and estimated to cost $3,000,000. Peppard & Fulton, consulting engineers, Superior, Wis., are preparing estimates.

The Simplicity Engine & Mfg. Co., Port Washington, Wis., has changed its corporate name to Simplicity Mfg. Co., and increased its capitalization from $50,000 to $100,000. Besides continuing the manufacture of gas engines, it will also enter the foundry and machine shop trade as a jobbing shop.

The Parker Pen Co., Janesville, Wis., has purchased an adjoining site for an addition to its plant.

The McVicker Railclamp Tieplate Co., 221 Grand Avenue, Milwaukee, recently organized, has bought a factory at Winthrop Harbor, Ill., and is planning to do its own manufacturing as soon as machinery is installed. It is in the market for two presses, one from 400 to 500 tons, the other from 250 to 350 tons; also a small forging hammer, squaring shears and machine shop equipment. E. M. McVicker is president.

Buffalo

BUFFALO, Jan. 28.

THE Department of Public Utilities, Jamestown, N. Y., is planning for an addition to the municipal electric power station to double, approximately, the present capacity. Melvin O. Swanson is superintendent.

A one-story foundry will be erected by the Westinghouse Machine Co., Attica, N. Y., as the initial structure of its expansion program involving $200,000.

Fire, Jan. 21, destroyed a three-story building, 60 x 200 ft., at the plant of the Iroquois Door Co., Exchange and Larkin Streets, Buffalo, with loss estimated at $250,000. Work was about to commence on an addition to cost $42,000. Plans for rebuilding will soon be arranged.

The Convertible Wagon Trailers, Inc., Buffalo, recently organized as an American subsidiary of the Municipal Wagon Co., Ltd., Toronto, has purchased a two-story building, 50 x 175 ft., adjoining the plant of the Cutler Desk Co., Riverside section. The new owner will take immediate possession and will remodel for a trailer and parts works. William H. Cooke of the parent organization is president and general manager of the new interest.

The Consolidated Brick Co., Horseheads, near Elmira, N. Y., has authorized plans for rebuilding the portion of its plant and power house, recently destroyed by fire with loss of $200,000 including machinery.

Inquiries are being made by the Public Service Garage, Oneonta, N. Y., for a drill press and other tools for its machine shop. C. H. Epps is one of the heads of the company.

A manual training department will be installed in the new school to be erected on Wolcott Street, Le Roy, N Y., estimated to cost $225,000, for which bids will be asked early in March. The Board of Education is in charge.

Fire, Jan. 22, destroyed the plant of the Papyrus Products Co., 52-54 Pearl Street, Buffalo, manufacturer of collapsible boxes and other paper containers, with loss estimated at $100,000 including machinery. It is planned to rebuild.

The Steam Vehicle Corporation of America, Syracuse, N. Y., has negotiations under way for the purchase of the plant and business of the Stanley Motor Carriage Co., Newton, Mass., for $860,000. It is purposed to improve the Newton works as a branch factory.

Henry & Allen, Inc., Wadsworth Street, Auburn, N. Y., manufacturer of agricultural implements, drop forgings, etc., has tentative plans for rebuilding the portion of its forge shop destroyed by fire Jan. 19, with loss approximating $75,000 including equipment.

Indiana

INDIANAPOLIS, Jan. 28

THE Indiana Electric Corporation, Indianapolis, is arranging for a bond issue of $1,390,000, a portion of the proceeds to be used for extensions and additional equipment.

The Honeywell Heating & Ventilating Co., Wabash, Ind., is arranging for an addition to its plant. A list of machinery will be prepared at once.

The Board of Public Works, Indianapolis, has plans for a one-story machine and automobile service building, 50 x 200 ft., for municipal trucks and cars, estimated to cost $80,000. F. B. Hunter, State Life Building, is architect.

The McQuay-Wainwright-Norris Mfg. Co., Connersville, Ind., manufacturer of piston rings, etc., plans for extensions and will install a heat-treating furnace, milling machine and other equipment.

The F. H. Langsenkamp Co., Indianapolis, has been formed with a capital of 1750 shares of stock, no par value, to take over the plant and business heretofore conducted by Frank H. Langsenkamp, 130-42 East Georgia Street, manufacturer of canning machinery and equipment, copper products, etc. Mr. Langsenkamp will head the new company.

J. W. Johnson, 718 North Walnut Street, Muncie, Ind., operating a forge shop, plans the installation of additional equipment, including blower, forge apparatus, tools, etc.

The D. & H. Lumber Co., Jeffersonville, Ind., recently organized, is perfecting arrangements for a local mill and power house and the installation of machinery. Clarence E. Howard and Fred K. Dunlevy, Jeffersonville, head the company.

The Pennsylvania Railroad Co., Valparaiso, Ind., is planning to rebuild the portion of its engine house and repair shops destroyed by fire Jan. 17 with loss estimated at $25,000.

The White Mfg. Co., Goshen, Ind., manufacturer of oil burners, railroad equipment, has perfected plans for the rebuilding of the portion of its works destroyed by fire several weeks ago.

The Horton Mfg. Co., Fort Wayne, Ind., has purchased the machinery of the Michigan Washing Machine Co., Muskegon Heights, Mich., and will remove it to Fort Wayne. The plant of the Michigan Washing Machine Co. will be

occupied by the Whyte Motor Control Co., which recently moved to Muskegon Heights from Chicago.

The Wilson Mfg. Co., 1519 East Nevada Street, Evansville, Ind., is in the market for a 2-spindle boring machine and a 2-hp., three-phase electric motor.

The Graham Truck Mfg. Co., Stringtown Road, Evansville, Ind., has awarded contract to the M. J. Hoffman Construction Co., Evansville, for a one-story, 180 x 240 ft. addition of brick, steel and concrete. Some new equipment will be required.

The Motor Oil Garage Co., LaPorte, Ind., is planning to rebuild its garage and service station, destroyed by fire Jan. 18 with loss of $150,000.

The Union Equipment & Outfitting Co., Muncie, Ind., a new organization, has leased a site from the Muncie Casket Co. and contemplates the erection of a steel and brick factory this spring, estimated to cost about $50,000.

The Mishawaka Monument Works, Mishawaka, Ind., will erect a new one-story plant 30 x 100 ft. Grinding, polishing and cutting machinery will be installed. D. A. VanDeWalle is the proprietor.

The Board of School Trustees, 226 South St. Joseph Avenue, South Bend, Ind., will take bids until Feb. 11 for machine tools and equipment for a school garage and shop in rear of the administration building. Claud J. Jackson is secretary.

The Gulf States

BIRMINGHAM, Jan. 28.

W. C. CATLETT, Pritchett, Tex., has commenced the erection of a factory to manufacture a patented farm planter and other agricultural equipment.

Fire, Jan. 22, destroyed a portion of the plant and power house of the Brewton Veneer Co., Brewton, Ala., with loss estimated at $50,000 including equipment. It is planned to rebuild.

The Birmingham Engine & Machinery Corporation, Birmingham, has inquiries out for two used Corliss engines, 16 x 36 in. and 24 x 48 in., respectively.

A. B. Hale, 1612 Highland Avenue, Tampa, Fla., and associates, are arranging for the erection of an ice-manufacturing and refrigerating plant at St. Petersburg, Fla., to cost about $80,000.

The Southwestern Power & Light Co., Fort Worth, Tex., has arranged a preferred stock issue of $1,400,000, a portion of the proceeds to be used for extensions in power plants and system. F. G. Sykes is president.

The Common Council, Mart, Tex., plans the installation of electric-operated pumping machinery in connection with waterworks extensions, for which bonds for $150,000 have been approved.

The Kaufman Metal Co., First and Clark Streets, Jacksonville, Fla., is in the market for one motor-driven, direct-connected blower for a 40-in. cupola.

The Otis Elevator Co., Houston, Tex., has awarded a general contract to Donald Hall, Houston, for a two-story machine shop at Jackson Street and McKinney Avenue, 50 x 105 ft., to cost approximately $35,000. A portion of the structure will be used as an office.

The Common Council, Trenton, Tex., plans the installation of electric-operated pumping machinery in connection with a proposed municipal waterworks to cost about $35,000.

Fire, Jan. 19, destroyed a portion of the electric power and ice-manufacturing plant of the Snyder Utilities Co., Snyder, Tex., with loss estimated at $35,000, including equipment. It is planned to rebuild. D. P. Yoder is president and general manager.

The New Orleans Public Utilities Co., New Orleans, is arranging an expansion program for the year to involve about $5,000,000. It is proposed to build an addition to the present power house and install a 20,000 kw. generator and auxiliary machinery.

The Florida Realty & Mortgage Co., Tampa, Fla., has tentative plans for the construction of a furniture manufacturing plant, with power house, to cost $100,000 with machinery. It is understood that a company will be organized to operate the factory. W. F. Miller is president.

The Union Bag & Paper Corporation, Woolworth Building, New York, is said to be completing plans for a new mill in the vicinity of Bogalusa, La., with power house, for the manufacture of paper bags and containers, to cost approximately $125,000 with machinery. The company is planning the erection of other plants in the South.

The Western Cotton Oil Co., Haskell, Tex., will take bids for equipment until about Feb. 15 for its proposed plant for the manufacture of cottonseed oil products, consisting of a main unit, 50 x 150 ft., and power house, 40 x 50 ft. The machinery will include four hydraulic presses, hydraulic pumping station, cake breaker and cutter, mote machine, crushing tools, hullers, portable scales, etc. Earl Cogdell is general manager.

Thomas Bryant, Cross Plains, Tex., an official of the Crabb, McNeal & Bryant Co., is at the head of a project to install and operate a local gasoline refinery to cost $75,000 with machinery.

The Royal Palm Rubber Co., Kelsey City, Fla., has awarded a general contract to E. H. Barto, Kelsey City, for the erection of a plant to manufacture tires and other rubber products, to cost $80,000 with equipment. G. F. Laughlin is president.

Manual training equipment will be installed in the three-story high school to be erected at Marshall, Tex., estimated to cost $275,000, for which bids will soon be asked on a general contract. W. G. Clarkson & Co., Fort Worth, Tex., are architects.

The Ford Motor Co., Highland Park, Detroit, has concluded arrangements for the purchase of 50 acres in the Eastern Heights section, Dallas, Tex., and has secured permission for the closing of six streets, for a new assembling plant. The initial structure will be one-story, 300 x 850 ft., with power house, estimated to cost $500,000 with machinery. Plans will be drawn by Albert Kahn, 1000 Marquette Building, Detroit, architect. W. C. Proctor is head of the present Dallas branch.

The Tampa Electric Co., Cass and Tampa Streets, Tampa, Fla., will build an addition to its generating plant, including improvements in the present station, estimated to cost $950,000 with machinery. Preliminary work has been commenced. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

The Loreauville Sugar Co., Loreauville, La., is planning to purchase five 72-in. x 18 ft., watertube boilers, to operate at 125 lb. working pressure. Used units will be considered.

South Atlantic States

BALTIMORE, Jan. 28.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Feb. 12 for 3000 ft. of wire rope for the Puget Sound Navy Yard, schedule 1814; until Feb. 5 for 25,000 ft. single conductor cable for the Washington Navy Yard, schedule 1811; until Feb. 12 for 47,200 lb. electrodes, schedule 1824; until Feb. 5 for miscellaneous padlocks for Eastern and Western yards, schedule 1829.

The Potomac-Edison Co., Hagerstown, Md., is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and additional equipment. M. F. Riley is president.

Arch M. and Benjamin H. Evans, Cumberland, Md., have purchased a controlling interest in the Lonaconing Electric Light & Power Co., operating at Lonaconing, Moscow, Pekin, Md., and vicinity. A new company will be formed and plans are under way for extensions and the installation of additional equipment. Arch M. Evans was at one time president of the company and will act in the same capacity with the new organization.

The Norfolk Blower & Pipe Co., Norfolk, Va., recently organized, has acquired another building for a plant to manufacture pipe, blower systems, etc. Machinery will be installed at an early date, including punches, shears, and other tools, electrically operated. C. T. Stotts is president and general manager.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for one 50 hp. vertical boiler.

Manual training equipment will be installed in the high school to be erected at Hickory, N. C., estimated to cost $225,000, for which bids have been asked on a general contract.

The Common Council, Rocky Mount, N. C., is arranging bonds for the construction of a municipal electric light and power plant.

A two-story and basement automobile service and repair building to cost about $90,000 will be erected by the Etheredge Motor Sales Co., Charlotte, N. C. Lane Etheredge is president.

The Southern Wire & Iron Works, Inc., Atlanta, Ga., has commenced the construction of an addition to its plant to double, approximately, the present capacity.

The Stockdell-Myers Hardware Co., 28 South Sycamore Street, Petersburg, Va., is in the market for one 4-side planer, 8 x 16, or larger; also for one 100 hp. side crank steam engine, and one 125 to 150 hp. return tubular boiler.

The Norfolk & Western Railway Co., Roanoke, Va., has awarded a general contract to John P. Pettyjohn & Co., Lynchburg, Va., for one-story machine shop at its East Roanoke works estimated to cost $65,000.

The Common Council, Farmville, Va., is perfecting plans for the installation of a municipal electric plant. A bond issue of $100,000 is being sold for this and other municipal improvements. E. E. Shield, chairman of the finance committee, is in charge.

Charles B. Silver, Havre de Grace, Md., has acquired the local shipyard of the Deibert Barge Building Co., recently in receivership. The new owner will operate the property and will make extensions and betterments, including additional machinery.

The Board of District Commissioners, Washington, will receive bids until Feb. 12 for hydraulic hoists for motor trucks.

The Board of District Commissioners, Washington, has approved a bill presented by the House District Committee providing for the construction of hydroelectric power plants on the Potomac River by the Government. The initial generating station will be located at Great Falls, and is estimated to cost $18,616,000; another plant will be constructed at the District Line, Chain Bridge, to cost approximately $13,600,000; and three storage reservoirs will be built to cost $13,000,000.

Fire, Jan. 18, destroyed a portion of the plant of the Wilmington Compress & Warehouse Co., Wilmington, N. C., with loss estimated at $75,000 including equipment. It is planned to rebuild.

A vocational department will be installed in the new high and grade school to be erected at Kingstree, S. C., to cost $75,000, for which plans have been drawn by W. D. Harper, Florence, S. C., architect.

The Common Council, Bryson City, N. C., has disposed of a bond issue of $100,000, the proceeds to be used for the construction of a municipal electric plant, for which plans will be prepared at once.

The Kline Desk Co., Inc., P. O. Box 35, Carthage, N. C., recently organized, is perfecting plans for the erection of a factory to manufacture flat top desks, tables, etc. The installation will include planers, jointers, mortiser, presses, sander, etc. Norman Kline is president, and Raymond C. Kline, secretary and treasurer.

Pacific Coast

SAN FRANCISCO, Jan. 23.

CONTRACT has been let by the Republic Brass & Mfg. Co., 1931 Violet Street, Los Angeles, manufacturer brass and bronze castings, to May & Grimwood, 719 Haas Building, for a one and two-story plant on Twenty-seventh Street, to cost $75,000 including equipment.

The Union Oil Co., Union Oil Building, Los Angeles, is disposing of a stock issue of $4,500,000, a portion of the proceeds to be used for extensions in refineries and pipe lines, including the installation of additional equipment. John McPeak is secretary.

The Pacific Fruit Express Co., 65 Market Street, San Francisco, a subsidiary of the Southern Pacific Railroad Co., is said to be concluding negotiations for the purchase of about 250 acres at Roseville, Cal., for the construction of new car repair shops, to cost $150,000 with machinery. A power house will be built.

A bond issue of $250,000 for extensions and improvements in the municipal power plant and system at Pasadena, Cal., has been approved by citizens. The Municipal Power Department will arrange plans at an early date.

W. E. Grove and A. R. Gann, Oildale, near Bakersfield, Cal., have acquired a tract of land for a new plant to manufacture water heaters, estimated to cost $22,000 with equipment.

The Los Angeles Gas & Electric Co., South Hill Street, Los Angeles, has plans for a one-story automobile service and repair building, 134 x 134 ft., estimated to cost $65,000.

The Delta Electric & Water Co., Central Building, Seattle, has secured permission to construct a hydroelectric generating plant on Pilchick Creek, near Everett, Wash., estimated to cost $200,000, with machinery.

The Utah-Idaho Sugar Co., Salt Lake City, Utah, has tentative plans for a new beet sugar refinery in the vicinity of Auburn, Wash., to cost close to $1,000,000 with equipment. A power house will be built.

The Union Pacific Railway Co., Pacific Electric Building, Los Angeles, has plans for additions in its engine house and locomotive shops at the East Yard, to cost $150,000. The structures will be one-story, 40 x 300 ft., 40 x 100 ft., and 11-stall engine house.

The Carbon Coal Co., 312 Henshaw Building, Oakland, Cal., is planning the installation of additional equipment at Carbon Camp, near Dos Rios, Cal., including hoisting apparatus, motors, cableway, forge shop machinery, and steam-operated electric power plant. A. L. Fisher is general manager and A. N. Massey, chief engineer.

The Commercial Fixture Co., 926 South Alameda Street, Los Angeles, has awarded contract to the Austin Co., Bartlett Building, for a one-story factory, 200 x 250 ft., to cost $75,000. The contractor will also prepare plans.

The San Joaquin Light & Power Corporation, Fresno, Cal., is disposing of a bond issue of $2,500,000, a portion of the proceeds to be used for extensions.

The Minarets & Western Railway Co., Pinedale, Fresno County, Cal., is having plans drawn for a one story engine house and locomotive repair shop to cost $50,000.

The Pacific Nitrogen Co., Seattle, operated by the Pacific Ammonia & Chemical Co., is perfecting plans for new works to cost approximately $250,000 with machinery. Robert P. Greer is managing director.

The Midland Counties Public Service Co., Coalinga, Cal., is planning for extensions and improvements in power plant and system to cost approximately $300,000 with equipment.

Canada

TORONTO, Jan. 28.

WHILE business in the machine tool market the past week was confined mostly to inquiries, selling interests point out that the outlook is bright and a strong demand for practically all lines is expected within the next few weeks. Industrial concerns have recently sent out inquiries on some extensive lists, a large portion of which are expected to result in sales. Automotive interests are preparing to enter the market and the mining industry of northern Ontario which recently purchased considerable equipment is making further arrangements to install mills and carry on other development work.

W. A. Lytle, 93 Balsam Street, Copper Cliff, Ont., is in the market for an emery grinder and bench tools for a blacksmith shop.

J. Juillet & Fils, Vaudreuil, Que., is erecting a sawmill and is asking for prices on equipment.

R. J. McClelland, Kingston, Ont., is in the market for equipment to manufacture cement blocks, brick, etc.

The Metal Wares, Ltd., has purchased the plant of the Schell Foundry & Machine Co., at Alexandria, Ont., also the equipment of the plant of the Leslie Tinware Co., Ottawa, which will be removed to Alexandria and installed in the Schell foundry building. F. A. Leslie is vice-president and manager of the new company.

J. H. Whalen, Massey, Ont., will purchase general equipment for a blacksmith and machine shop.

The Kaustine Mfg. Co., Dundas, Ont., is in the market for machinery to be installed in a proposed addition to manufacture sewage disposal equipment, etc. J. F. Crowley is purchasing agent.

Price Brothers, Quebec, are having plans prepared for a pulp mill to be erected in the Lake St. John district.

Plans are being prepared and bids will be called in the spring by the Montreal representative, A. P. McKinnon, 11 Place D'Armes Square, Montreal, for the erection of a sawmill at Cap Rouge, Que., to cost $1,000,000, for the St. Regis Paper Co. of New York City.

Plans are being prepared for a machine shop to be erected at Sudbury, Ont., for the Sudbury Construction & Machinery Co., to replace a building recently destroyed by fire with a loss of $18,000. New equipment will be purchased.

Western Canada

The Board of Harbor Commissioners, Vancouver, B. C., will erect coal bunkers at a cost of $500,000 to handle coal from the interior of British Columbia and Alberta.

The Granby Consolidated Mining, Smelting & Power Co., Birks Building, Vancouver, B. C., is in the market for machinery and equipment for a new plant. K. Roem is purchasing agent.

H. B. Armitage, president of the Armitage Lumber Co., Edmonton, Alta., will establish a branch factory at Point Grey, B. C.

D. M. Hartnell & Co., Port Hammond, B. C., are having plans prepared for a $200,000 mill to be erected at Port Coquitlam, B. C.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.
Steel plates, ¼ in. and heavier	3.64c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.40c. to 4.45c.	.....
Nos. 22 and 24	4.45c. to 4.60c.	5.10c.
No. 26	4.50c. to 4.65c.	5.15c.
No. 28*	4.60c. to 4.75c.	5.25c.
No. 30	4.80c. to 4.95c.	.....

Galvanized

	Per Lb.
No. 14	4.70c. to 4.85c.
No. 16	4.85c. to 5.00c.
Nos. 18 and 20	5.00c. to 5.15c.
Nos. 22 and 24	5.15c. to 5.30c.
No. 26	5.30c. to 5.45c.
No. 28*	5.60c. to 5.75c.
No. 30	6.05c. to 6.20c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel Black	Galv.	*Wrought Iron* Black	Galv.
½ in. Butt	—41	—24	½ in. Butt — 4	+19
¾ in. Butt	—46	—32	¾ in. Butt —11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt —11	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap — 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap — 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap — 3	+16

Bolts and Screws

Machine bolts, cut thread, 45 and 10 to 50 and 10 per cent off list

Carriage bolts, cut thread, 35 to 35 and 10 per cent off list

Coach screws ..... 45 to 50 and 10 per cent off list

Wood screws, flat head iron, 75, 20, 10 and 7½ per cent off list

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 18¼c.
High brass wire	17¾c. to 18¾c.
Brass rods	15 c. to 16 c.
Brass tube, brazed	25¼c. to 26¾c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	22½c. to 23½c.

Copper Sheets

Sheet copper, hot rolled, 20 to 20½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14 x 20 Prime	Seconds
		80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	52c.
Bar	60c. to 62c.

Copper

Lake ingot	15½c.
Electrolytic	15 c.
Casting	14 c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10¾c. open 11½c.

Lead and Solder*

American pig lead	9½c. to 9¾c.
Bar lead	12c. to 13c.
Solder ½ and ½ guaranteed	35¾c.
No. 1 solder	33¾c.
Refined solder	29¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	12½c. to 13c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is firm and inquiry is better. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	4.75
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	7.75
Lead, heavy	7.00
Lead, tea	5.75
Zinc	4.00
Cast aluminum	17.00
Sheet aluminum	17.00